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CONTRIBUTIONS.—Subscribers and others will materially assist in making our news accurate and complete if they will send early information of events which take place under their observation. Discussions of subjects pertaining to all departments of railroad business by men practically acquainted with them are especially desired.

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VOL. XLI., No. 10. FRIDAY, SEPTEMBER 7, 1906.

With the Pennsylvania Railroad taking in $170,000 yearly for every mile of its road from Pittsburg to Philadelphia, 354 miles, it is no wonder that Mr. Ramsey can find capitalists ready to back him in building a rival railroad. The Pennsylvania's line, nearly all four-track, is already filled with trains so nearly to its capacity that the company is building a second and separate railroad of two tracks from the Susquehanna river to New York bay. Moreover, Mr. Ramsey's claim that he can improve greatly on the Pennsylvania, both in grades and distance, between Pittsburg and New York may not be so wild as it seems. It is easy to believe that a grade of 20 ft. to the mile need not be exceeded from Pittsburg to New York, but in claiming to have found this easy grade, while at the same time saving 65 miles in distance, a promoter must expect to encounter incredulity. There are too many mountains in the path. Still, the ground, or most of it, has been gone over by many surveying parties during the past 20 years, and if Mr. Ramsey is claiming too much, there will be competent engineers to dispute him. As the whole announcement seems for the present only a feeler, intended for financiers' consumption, it is perhaps hardly worth while to analyze it; when Mr. Ramsey really wishes to inform the public he will give out something definite in place of the very round figures now published. But, really, he might be a trifle more definite, even in giving the reporters a hot weather "filler." An average cost of $150,000 a mile, Pittsburg to New York, is an estimate with no meaning. What is the average, excluding terminals? And what is the cost of new terminals in cities where the existing lines have cost $500,000 to $1,000,000 a mile? Terminals are vitally necessary for securing the four or five hundred cars of freight a day necessary to pay the interest on the cost of the road—even at the low figures of cost which have been given (fifty millions). And there is another necessity that may cost a new road more than its terminals, the friendship of the shippers. The anthracite coal field is mentioned as fertile ground for tonnage; but what new railroad could get within hailing distance of the mines? Railroads which are within a mile of rich traffic and yet cannot get hold of it, are too common not to be a warning to any investor who is at all cautious. However, we write all this, not to throw cold water on Mr. Ramsey's project, but merely as an invitation to him to make public some of the really interesting portions of the reports that have been made to him by his engineers during the past three years. As we have said, it is not surprising to hear that he has had capital offered him; but why not give the facts which will invite still more capital and thus reduce the rate of interest which will have to be paid for it?

What does it cost to build a railroad? We have been asked this question many times, and have replied that it depended on three principal factors: the cost of real estate for route and terminals, the nature of the country, and the kind of a railroad that it is desired to build. Yet in spite of the tremendous variations which these elements present, it is distinctly possible to make an off-hand estimate, taking each of the elements into consideration, which will roughly approximate the sum that the finished work is likely to cost. There are many occasions when a railroad officer who is not an engineer—or indeed a railroad officer who is an engineer—wants just such an approximation for projected new work, without waiting for a careful, finished estimate based on the detail cost of cuts, fills and rock work. It seems desirable, therefore, to print such information as can be gathered relative to the costs of finished output in specified localities—a method having the same analogy to the engineer's hand book that the case system of teaching law has to the text-book system. With this end in view, we have requested a large number of railroads actively engaged in new construction, to state the cost *per mile* of some of their new road, including preliminary surveys, clearing right of way, roadbed, ties, rails, ballast and side tracks, but not including real estate, stations, equipment or signals, since these latter items belong in the highly variable group. To make this "case system" of railroad costs more definite and easy to grasp, we have in each case asked for photographs of the section referred to. Following the principal study of the cost of the finished line, we propose to give supplementary data with regard to the cost of the items that go to make it up—ballast, rails, ties, earth and rock excavation, tunnels, etc., and to express the cost of these items in terms that can be grasped, in the largest possible units, by readers who have not had engineering training. The success of the study depends largely upon the assistance we receive, but in any case it

should be possible to formulate a series of rule of thumb estimates that will have considerable value. The first instalment of these papers is printed this week, and deals with the finished cost of certain stretches of high class railroads in the East.

GRAVEL WASHING PLANTS

The work of the Lake Shore in developing plants for washing gravel in quantities sufficient to furnish an adequate and continuous supply of ballast is of material interest to all roads using gravel ballast to any extent and thereby suffering more or less from dust. The good results from the application of the washed ballast as a dust-covering on the Lake Shore are quite apparent in riding over the part of the line already treated, becoming even more so, by contrast, in passing to the portion not yet covered. Even to a person riding on the rear platform of a fast train there is practically no dust perceptible, while such a station is for the most part untenable over the unwashed ballast during any but wet weather.

The mitigation of the dust nuisance undoubtedly had become a vital matter with the Lake Shore, with its large number of fine limited trains daily. It has always been a gravel ballasted road practically throughout and has maintained a splendid roadbed with this material, the easier riding qualities of which make it preferable to stone in this respect. By the removal of the dust-producing constituents the only serious objection to it is overcome, yielding an ideal ballast, which the figures given in the article printed elsewhere show to cost approximately one-half what rock ballast does, with a washing plant the size of that at Pleasant Lake, and under the average conditions there assumed. With a possible source of profit present in the enormous quantities of sand produced, opportunity exists for materially reducing the cost of the ballast. This, of course, is dependent on the proximity of the washer to a city of sufficient size to furnish a market for building sand, as otherwise the freight charges, or engine service charges, would absorb the profits.

A point especially worth noting in connection with the Lake Shore's experience with its two plants is the desirability of electric power for driving, alternating-current apparatus being preferable to direct-current because of the absence of commutators. Where power is not available from a source similar to that at the Rupel plant, experience seems to indicate the advisability of installing an electric generating plant, in preference to the method used at Pleasant Lake. Another detail of primary importance is the pump, which should be of sufficient capacity to allow an ample margin above the estimated consumption of the plant; an adequate water supply, being, of course, one of the most important requisites in the successful operation of the plant. For this same reason proper care should be exercised in providing the pump drive, an individual motor being best where practicable, making the pump independent of the other mechanism.

STATE RAILROADS—THE LESSON OF BELGIUM.

In the May number of the *Revue Politique et Parlementaire*, the place of honor is given to an article dealing with the results obtained on the State Railroads of Belgium as compared with those on the companies' lines in France, more especially the Nord.

The writer is apparently unbiased, and the article is written with a view of enabling the French public, before whom the question of the purchase of the Western Railroad of France has recently been mooted, to form some conclusion on the relative advantages of company and state control. He first of all points out the fact that, generally speaking, in democratic countries such as France, Great Britain and the United States, the railroads are worked by companies, whereas in monarchical countries—Germany, Austria and Russia—they are worked by the state, and he points out that the fact that the most businesslike nations all have their railroads managed by companies is a strong argument in favor of that course.

It is six years since Monsieur Renkin, of the Central Section of the Chamber of Representatives in Brussels, made his historic attack upon the Belgian railroads, and the writer of the present article shows that instead of improving, things have gotten even worse since that date. In order to be perfectly fair he chooses the Northern Railroad of France as the nearest to Belgium and the one under the most similar conditions. He shows that the cost of administration in every department has gone up since the state acquired control, that whereas the French railroad is operated for 52 per cent. of its receipts, the working of the Belgian Railroad absorbs 60 per cent., and this in a country where the population is three times as dense, where iron is considerably cheaper and where the receipts per mile are much higher. He gives endless figures to show that this does not arise from better service, that the trains are much slower and much more unpunctual than over the frontier. He shows that the wages paid in Belgium and the conditions of the employees are not a whit better than in France, and that, in fact, the only people who benefit have been a number of higher officials whose posts did not previously exist, as well as the members of the Chamber of Deputies.

That he is not alone in his contention he shows by quoting from members of all political parties, including the socialists, one of whom showed that whereas the average speed of the best express trains on the Nord Railway was from 44 to 59 miles per hour, it dropped to 31 as soon as the trains crossed the frontier, in spite of the fact that the levels were much better.

The second instalment of this article is continued in the June number of the *Revue*. In this the writer shows that the one and only excuse for nationalization has been that the workers themselves are better off under the state than under a private company, but his figures show that whatever may be the case in other countries, in Belgium quite the contrary has taken place. The insufficiency of wages paid, which are in many cases as low as 42 cents to 57 cents a day, show this. As the result of a great deal of agitation, the ministry has now fixed the minimum salary at 2 francs 40, or, say, $3.25 a week, and this in a country where living is none too cheap. Guards get 83 francs, say, $16 a month, while brakemen start at 53 cents a day. The hours of work are apparently as bad in Belgium, if not worse, than elsewhere; 15, 16 and 18 hours a day are worked by guards, and the writer shows that frequently the regular allowance of eight hours' rest between the two services is interrupted. In short, neither the taxpayer nor the worker, nor the traveling public appears to derive any advantage from the fact that the Belgian railroads are owned and worked by the state.

THE PENNSYLVANIA SALE.

It was announced September 3d that the Pennsylvania Railroad Company had sold 400,000 shares of Baltimore & Ohio and 160,000 shares of Norfolk & Western to Kuhn, Loeb & Company. The official circular said further that these stocks were purchased some six years ago for the purpose of establishing such relations with the managements of those properties as would incline them to join the Pennsylvania Railroad Company in an effort to do away with secret rebates and preferences, but that the desired result having been fully realized and the management entertaining no fears that the railroads of the country would ever fall back into the old practices, the directors of the company thought it wise to reduce its ownership in these roads, which has been done by selling aproximately half its holdings in them. The circular adds that on account of the allegation repeatedly made that the Pennsylvania was seeking to control the tidewater bituminous coal traffic, the directors took action in deference to the present state of public opinion upon such matters, although there was no foundation for the charge and although it was confidently believed that the company was entirely within its legal rights in purchasing and holding these stocks.

This sale has several aspects of quite unusual interest. When the Baltimore & Ohio stock was put on a 6 per cent. basis a short time ago, it was generally thought that this had been done to increase the income of the Pennsylvania derived from its securities held—an increase which was perfectly justifiable, inasmuch as the Baltimore & Ohio earns on its stock at the present time about twice the amount now to be paid in dividends—but in view of recent events, it is probably safe to assume that it was the sale of this stock and not the income from it that was the primary occasion for the increased dividends. This, too, is in no wise open to criticism, except that it tends to weaken the impression, just now very strong, that the great earnings of 1906 necessarily mean increased dividends, regardless of hidden policy. The other aspect of the case most worthy of attention is the plain and consistent stand taken by the Pennsylvania in support of the anti-rebate movement and of anti-rebate legislation. The company says perfectly openly that these roads, in the management of which it secured a large voice several years ago, used to be bad, but that they are good now and it believes that they will stay good. The Pennsylvania has

also been in the van of the movement to do away with free transportation, even at considerable cost, as in Ohio.

We have always maintained that the cure for most of the evils in the railroad world, brought on by the irresponsible conduct of the weak neighbors, was a perfectly steadfast attitude on the part of the stronger roads. The Pennsylvania evidently believes that the present Interstate Commerce act furnishes the necessary legal backing for such an attitude, and in its new policy of publicity and of conformance with the outer reaches of public opinion—as in the case of the sale of the Consolidation Coal properties by the Baltimore & Ohio—it clearly intends to take a position not only above reproach but also above suspicion. On no other grounds is it possible to see the wisdom of the sale of the Consolidation Coal Company. As regards the recent sale, we do not pretend to express an opinion that the company was more influenced or less influenced by public opinion than by the fact that it needed funds to complete its New York tunnel work and did not care to undertake new financing at present. Nevertheless, in these times when railroads are a general target for hostility and criticism, a little obvious piety of attitude is surely not going to do any harm. Strong railroads all over the country naturally wish to see the whole fabric of rebate and discrimination crushed. They have their opportunity now to come forward prominently on the side which is at once the politic and the popular one, and the Pennsylvania is surely taking the best measures to set at naught the devices of the professional anti-corporation agitator. What looks now like a considerable political issue may quite conceivably melt away like snow in the sunshine, if a group of the strong roads of the country take pains to put themselves not only on the windy side of the law, but of public opinion as well.

NEW PHASES OF RAILROAD FINANCE.

Among the large railroad systems of the country no corporation has pushed the theory of consolidating branch lines more systematically than the New York, New Haven & Hartford. The official list of the lines of that system, either merged already or under lease, number no less than 31, all of them originally independent; and of the 31 lines, large and small, 22 roads have either been actually merged already or that merger—barring legal technicalities not likely to prove serious—is near at hand. That steady process and policy of merging has of late had a variation which introduces us to a somewhat new phase of railroad finance, which may hereafter have both examples and meanings beyond the bounds of the New Haven system.

Some months ago we had occasion to point out, in connection with the "bond period" of American railroad finance, when lavish issues of bonds, most of them of high quality, were thrown upon the market, how those issues had, if we may use the term, "saturated" the local markets. It was a fiscal condition that has measurably continued until the present time. Stated briefly, almost every great railroad system, especially a system in our states of the East or Middle West, must rely largely on capital within its own territorial area for placing new bonds. Such marts for the new securities are not merely the large cities. They include also the smaller provincial cities, the savings banks of the smaller country towns, and even those little country towns where there dwell individual capitalists, large or small. In such a region of its own, let a great railroad corporation issue an abundance of new securities, and sooner or later comes an inevitable fall in the quotations. It is not so much a decline in credit, using that word in the absolute sense, for general confidence in the strength of the corporation and the endurance of its prosperity is as strong as ever. It is simply the logical outcome of the law of supply and demand. The communities have not the money to take up the excessive supply of new bonds; and added to this is the mental scruple of the investor based upon the saw, "too many eggs in one basket," and the acquiring of large interests, directly or indirectly, vesting in one corporation—an argument specially effective with savings banks and trustees forced periodically to make returns of fiduciary funds.

This was exactly the fiscal situation which has faced the New Haven Company in seeking new funds for its extensive improvements and the extension of its electric railway holdings. It found a "saturated" market for its securities bearing the title head of the main corporation. Just before taking the recent steps for the merger of the Naugatuck, the Northampton and the Air Line divisions, and the extinction of their corporate existence, the New Haven Company announced considerable issues of mortgage bonds on those lines, and under their old corporate titles. The purchaser of the new security thus holds a bond not only secured by a special mortgage, but bearing a separate corporate title. He escapes, in form at least, his mental scruple against "overloading." On the other hand, the parent corporation profits by the higher price and consequential lower fixed charge, the enhanced security being a small consideration for a corporation which regards all its own securities as gilt edged. Many great railroad systems of the country besides the New Haven have subsidiary lines which they want to merge. It will be interesting to mark, in the future development of railroad finance in this country, how far this example of the new divisional mortgage, as a preliminary to merger adopted by the New Haven, will be followed. No doubt it will depend much on the condition of the bond market, the rates for money, and the general fiscal situation. If the present "bond period," already protracted, continues long enough, we may yet see the device reach large dimensions and possibly some great railroad corporations regretting that they have extinguished the subsidiary corporations prematurely—especially as the old underlying divisional mortgages fall in, are paid off and leave the divisions free from original debt.

Another novel and striking situation in connection with steam-trolley finance is presented by the same New Haven Company in handling its great electric holding corporation, the Consolidated Railway. The latter company in its rapid extension reaching over into Massachusetts, has been financed on a basis of "debenture" bonds of a somewhat peculiar character. According to the last report of the Connecticut Railroad Commission these debentures outstanding, running for long periods, and most of them four per cents, amount to $12,070,400, and, if we are not mistaken, have somewhat increased since. As debentures they are unlimited as to issue, but, as under their terms no mortgage can be placed ahead of them, they practically represent all the equity of the consolidated (street) railway system and have a pretty definite mortgage quality. Several months ago the parent steam corporation offered its own stock in exchange for these debentures on a convertible ratio of two for one, i. e., five shares for each bond of $1,000, the option expiring July 31, 1906. Here was a unique situation. In the first place was the novelty of proposed exchange of trolley for steam securities on a large scale. Again, at the time, several months ago, when the New Haven directors made the offer, the stock of their road was selling at about 201 a share, the Consolidated Railway debentures at 98, or 196 as immediate price in debentures of the stock—a clear profit from quick sale of the stock and purchase of the debentures by the proceeds and the substitution of an assured eight per cent. interest rate for a contingent eight per cent. dividend rate. Moreover, if the stock had risen during the period of convertibility, there would have been for the new bondholder opportunity for a fresh profit by making the conversion. In fact, the stock fell, and only a small fraction of the bonds were converted. But, had the convertible scheme succeeded, the security of the remaining bondholders would have been greatly enhanced, subject, however, to the peril of new debenture issues at an increased price. A kind of endless chain of convertibility and new issues is thus suggested as a method of sustaining the market value of the debentures—though suggested as a mere possibility.

In such processes of steam-trolley finance there is also the further evidence of the definiteness and permanence of the street railway purchases made by the Eastern railroad corporations. That those purchases must ere long become part of the general capitalization—either in stock or debt, or both—of the steam roads is undoubted. To accelerate the mergers we are likely to see some special inducements offered to street railway security holders, and, as in the case of the New Haven Company, the readjustments following some novel lines.

The Work of the Interstate Commerce Commission.

The pamphlet which has been printed by the Interstate Commerce Commission containing the revised Act to Regulate Commerce, serves to call attention to the fact that the Commission is now charged with a considerable variety of duties; for it contains in its 59 pages no less than 15 laws—not including the Sherman anti-trust law of 1890. Evidently the whole of the seven commissioners will have ample opportunity to fill up with work the seven hours a day that the government requires of its servants in Washington. Besides the Interstate Commerce law itself, and the Elkins law of 1903 (which is still kept separate from the law of 1887), there are three supplementary acts and two others of a local nature; and two concerning the coal and oil investigation, which made such

a stir on the Pennsylvania Railroad; the Safety Appliance laws, the law requiring monthly accident reports, and the resolution calling for an investigation of the use of the block system in the United States. Lastly, we have the law of 1898, providing for arbitration of labor disputes on railroads, in which the chairman of the Commission is charged with important functions.

It may prove that none of these laws are dead letters. The arbitration act of 1898 has been quite generally regarded as dead, up to the present year, but now the Brotherhood of Railway Telegraphers is making a determined attempt to apply it to one or two roads in the South—not on the arbitration issue, but to enforce section 10, forbidding an employer to discriminate against employees on account of their membership in a labor union.

The block system resolution, radically different, in subject matter, from any general law which has been prominent in the Commission's activities heretofore, has this week been made the text of a circular sent by the Commission to all the roads of the country calling for information concerning their practice. The circular asks for information concerning the number of miles in use on each road of each kind, manual and automatic; the percentage of road block signaled; and the rules for the operation of trains under the block system. Information is also asked concerning automatic stops, if any are in use, and as to whether crossings and drawbridges are interlocked with block signals. A clause in the order requires special information concerning divisions on which block sections are more than four miles long, and each road is asked to answer the question whether the block system is economical, aside from its use as a protection to life and limb; also to what extent the block system has reduced collisions, and to what extent it has increased the capacity of lines.

This investigation should result in useful enlightenment of the public, for the information which it contemplates has long been needed. The *Railroad Gazette* has gathered similar information, but not with the completeness of detail that the government can command; and the *Railroad Gazette* has preached the virtues of the block system, but often to unresponsive hearers. We hope that the government can put our efforts in the shade, as it has already done in accident records. A large majority of the Commission's circulars must come back with blank answers, for not one-tenth of our companies have block signals; but those roads which have something to report and have made progress in the use of the block system deserve the commendation which a government report can give them.

It seems likely that the enlarged Commission may have plenty of work to engage its energies in administering the Interstate Commerce law itself, leaving block signals, labor questions and air brakes out of the account. Already the merchants of Spokane and the cattle men of Texas have reappeared with their grievances, which have been investigated in past years, but have failed of settlement because the Commission lacked mandatory powers. It is clear that the adjustment of little irregularities and the punishment of secret practices do not constitute the only field in which a stronger Federal law was wanted; these cases illustrate the demand for actual, radical and bald reductions of rates; and there are numerous others like them. The Texas complaint is against the railroads running from that state to Chicago, concerning their rates on cattle and also the rates for delivering cars to the stock yards in Chicago. The Interstate Commerce Commission long since decided that these rates ought to be reduced, and appeal was made to the courts, but no decisive result was accomplished. The Spokane case is in form a complaint against the long and short haul law, and involves the perplexing question of competition by ocean vessels; but essentially it involves the question of the absolute justice of the railroad charges from the East to Spokane. The merchants of Denver again complain that dry goods and other high-class commodities are carried from the East to California cheaper than to Denver; and fruit commission merchants of Macon, Ga., complain of exorbitant rates on peaches to northern cities. This complaint not only sets forth the rates now charged, but declares that such and such lower rates would be reasonable. Complaint is made of the refrigeration charges also, and it is declared that the railroads ought not to farm out the refrigerating business to a private company and compel shippers to make two contracts. A firm in Chicago has presented a complaint against the Wells-Fargo Express Company.

The first order issued by the Interstate Commerce Commission under the revised law is one permitting the Boston & Maine to reduce rates on ice from Maine, New Hampshire and Vermont to Boston without giving 30 days' notice; a five days' notice will be accepted. This is on account of an urgent demand for ice because of the shortage of the ice crop "and for other good reasons." Can it be that we are going to have rate-regulation by telegraph? A committee of Chicago merchants recommends that a road desiring to meet a competitor's rate be allowed to do so without notice, provided that it sends word by telegraph to the Commission and that it takes care not to go below the competitor's figure; and this Boston decision seems to be almost equally "fly." Surely, if changes are to be made while a piece of ice is melting in an August sun, something at least as speedy as the telegraph will be needed. And why not? The Texas commissioners have made emergency rates on scrap iron; and of how much more worth is a mint julep!

Railroad Accidents in Great Britain in 1905.

The "General Report" of the British Board of Trade, reviewing the railroad accident records of the United Kingdom for the year (1905), made by Mr. Herbert Jekyll, gives a very intelligent summary of the salient facts shown by the statistics and, we may say in passing, is presented in better shape than in former years. The principal totals for 1905 and for the year preceding are:

	1905		1904	
	Killed.	Injured.	Killed.	Injured.
Passengers, in train accidents	39	396	6	534
Passengers, other causes	109	1,972	109	2,135
Employees, in train accidents	6	112	7	114
Employees, other causes	393	3,688	409	3,807
Other persons	552	291	542	299
Total	1,099	6,459	1,073	6,889

The number of passengers killed in train accidents in 1905 was greater than in any year since 1899, and 38 of the 39 are attributed to four accidents: Hall Road, 21; Witham, 10; Cudworth, five; Huddersfield, two. The first three were reported in the *Railroad Gazette*. The number of passengers *injured* in train accidents was much below the average, and reviewing the accidents for many years the conclusion is reached that there is no relation between the numbers killed and the numbers injured from this cause. The number of employees killed in train accidents, six, compares with an average of seven for the preceding four years. Before that the numbers were larger; but even at the largest the totals are phenomenally low as compared with the figures for the same class of accidents in America. There is no profit in controversy concerning the differences between England and America in the matter of safety on railroads, but it is perhaps pertinent to suggest to those who have tried hard to make instructive comparisons and who have been bothered by the uncertainties that beset most of the factors of the problem, that this item—employees killed in train accidents—is more free from fluctuations than any other in the list, and therefore would furnish more satisfactory illustrations. Unfortunately for America, however, the record in England is so much better than ours that the satisfaction is likely to be all on that side. Our train mileage is about 2½ times theirs, but our fatal accidents to employees in train accidents total so large that we shall refer the reader to the Government reports for the figures.

Concerning accidents on and around trains, exclusive of train accidents, the report says: "In this class there is little change. The casualties to passengers are much more numerous than those caused by train accidents, but they mostly arise from the carelessness of the passengers themselves. The casualties to employees from this cause are unhappily always numerous. More close and continuous attention is given [by the government] to this than to any other class of accident, because it includes a proportion, though not a large one, of accidents that may be termed preventable. It is therefore satisfactory to note the diminishing frequency of these casualties. Analysis of the casualties in 1905 shows that out of every hundred, 57 were due to misadventure, 32 to want of caution or misconduct on the part of the injured persons, and five to want of caution or breach of rules on the part of other servants, leaving only six attributable to preventable causes. It follows that unless men can be induced to take the reasonable precautions which the conditions of their occupation among moving vehicles call for, there is little room for any substantial reduction of these lamentable accidents."

The number of collisions and derailments in 1905 was 199, while the average of the previous 25 years was 217. The average per train mile is, of course, much larger than here shown, as the train mileage has increased. The reduction in frequency per train mile is, in fact, nearly 34 per cent. This is attributed to improvement in permanent way, to the use of continuous brakes, and to increased vigilance and care on the part of the workmen.

Of the 24 train accidents inquired into by the officers of the board, 21 were due wholly or partly to misconduct or negligence. Other causes figuring in this list are, excessive speed (in seven cases) and foggy weather (two). Accidents to passengers in other than train accidents continue to show no marked change in totals. Most of these accidents are "due to want of common care and caution on the part of the passengers themselves." The number of employees killed and injured on or around trains, aside from train accidents, shows a gratifying improvement. Comparing 1905 with the previous nine years, the casualties happening to employees under this head were in the following proportions:

	1905	1896-1904
Goods guards and brakemen	1 in every 21	1 in every 18
Permanent-way men	1 " " 309	1 " " 235
Engine drivers	1 " " 78	1 " " 60
Firemen	1 " " 49	1 " " 41
Shunters	1 " " 19	1 " " 15
Porters	1 " " 100	1 " " 84
Passenger guards	1 " " 80	1 " " 60
Laborers	1 " " 333	1 " " 279

The diminished frequency of accidents to freight train men and

yard men is attributed to the general use of the coupling pole and to better lighting of yards, though it is remarked that the coupling pole introduces a new danger, and has accounted for 21 accidents in 1905. The causes of accidents to employees on or around trains, excluding train accidents, are further classified as to causes in the following table:

Causes.	Inquired into.	Not inquired into.	Total.
A. Misadventure or accidental	120	2,200	2,320
B. Want of caution or misconduct on the part of the injured person.	334	995	1,329
C. Want of caution or breach of rules on the part of servants other than the injured person.	118	75	193
D. Defective system of working, dangerous places and conditions of work, etc.	83	18	101
E. Defective apparatus, want of appliances or safeguards, etc.	39	74	113
F. Neglect or non-observance of Rules under Prevention of Accidents Act.	23	2	25
Total	717	3,364	4,081

Of the 190 casualties to trackmen some are attributed to failure of the boss to provide an efficient lookout, which is an infraction of Rule 9 of the Prevention of Accidents Rules.

A newspaper correspondent in New Mexico reports that the route of through passenger and freight trains over the Atchison, Topeka & Santa Fe between Chicago and the Pacific Coast, is to be changed for nearly 800 miles, or more than one-third of the total distance of 2,265 miles between Chicago and Los Angeles; and the new line is in some places 250 miles south of the old one. It appears that this report, although premature, has a basis of truth. The completion of the Atchison's line from Belen, N. Mex., 30 miles south Albuquerque, eastward 250 miles to Texico, N. Mex., gives the company an alternate through line from Rio Puerco, N. Mex., which is 34 miles west of Albuquerque, eastward to Florence, Kan., 173 miles west of Kansas City. The distance from Florence by the old line via La Junta and the Raton Mountain to Rio Puerco, is 780 miles. The distance saved by the new line is inconsiderable—11 miles, it is said—but the saving in locomotive power is marked. By the existing line long grades of 187 ft. per mile have to be surmounted in the Raton Mountains, while on the new line the maximum grade eastbound is 32 ft. to the mile, except for about 25 miles, where there is a grade of 66 ft. to the mile, and where helping engines will have to be used. While the 250-mile connecting link between Belen and Texico is nearly ready for use, the existing lines east of Texico will have to be changed a great deal before they will be suitable for heavy and fast trains, and the company has not yet decided upon any date for changes to be made in through traffic. The management does intend, however, to use the new line for through freight and for the fast mail trains; also possibly for other through trains. This will probably be one of the most extensive changes of the kind ever made. Apparently no less than ten important towns are likely to suffer some diminution in their through passenger accommodations.

NEW PUBLICATIONS.

The Elements of Machinery. Constituting Vol. 1 of an illustrated technical dictionary in six languages: English, German, French, Russian, Italian and Spanish. Compiled after a novel method by K. Deinhardt and A. Schlomann, engineers. With 823 illustrations and numerous formulas; 403 pages; cloth. The McGraw Publishing Company, New York, 1906. Price, $2.00.

It is fair to say that this is the most remarkable technical dictionary in foreign languages which has ever come to our attention, and its conception and the method in which the task has been carried out are worthy of the highest praise. The essential characteristic is that the topics are treated under separate branches, while at the same time a sketch or diagram is introduced. This latter is of very great value in dealing with foreign terms the meaning of which is not quite clear, especially where the use is wholly technical and the changes of practice introduce frequent variations. Volume 1, in addition to its words dealing with the elements of machinery, includes also the tools most frequently used in metal and wood working, and the definitions are carried out most explicitly and in great detail. For example, under the general heading "hammer," twenty-eight kinds of hammers are given, and nineteen of these are illustrated. Such technical terms as "degree of eccentricity" not only have their equivalents given in the six languages, but are made perfectly clear by the accompanying illustrations. At the back of the book there is a vocabulary in each of the six languages, which refers to the page on which the illustration and corresponding terms are given.

So far as we know, nothing like this has been attempted before in a technical dictionary, and yet it is clearly the way that all technical dictionaries should be made. We are glad to know that Volume 1 is to be followed by subsequent volumes dealing with electrical apparatus, with steam boilers and steam engines, with hydraulic machinery, with hoisting and conveying machinery, with small tools and machine tools, with railroads and railroad appliances, with structural iron work and bridges, with metallurgy, with architecture and with naval construction. The authors are to be much congratulated on undertaking this line of work and carrying it through in so useful a manner.

Catechism on Producer Gas. By Samuel S. Wyer, M. E. Forty-two pages; pocket size; cloth. The McGraw Publishing Company, New York, 1906. Price, $1.00.

This is a useful and convenient discussion of the elements of gas manufacture in the clear form of a series of questions and answers. While primarily a technical hand-book, it is expressed in terms readily understood by the layman.

Directory of the Alumni of Stevens Institute of Technology. Published by Stevens Institute Alumni Association, Hoboken, N. J., 1906. Price, 50 cents.

This directory is valuable in that it supplies a classified list of highly trained engineers. Following an alphabetical list of the alumni of the Institute, in which the year of graduation is given after each man's name, a geographical classification is made, and there is also a business directory or classification, arranged according to industries.

CONTRIBUTIONS

The Golden Rule in Handling Freight Cars.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Your two articles calling for the exercise of the Golden Rule in the handling of foreign cars will, I hope, have a good effect, although they come pretty near the old transcendental injunction, "Be good and you will be happy, but do not be good in order to be happy."

I think I can safely say for the Golden Rule, that after having tried both the Golden and Iron Rule on our system, I find more foreign cars are sent to us to-day when we are handling foreign cars decently than were sent to us last year when we were handling forign cars outrageously.

It may be that the trend of traffic has turned, or it may be that we are more successful in making our people use foreign cars for foreign loads than we were, but it certainly is a coincidence that points to the idea that honesty in car handling may be the best policy.

I am a little troubled by the possibility that if everybody were honest there would not be enough "best policy" to go around. There are only so many cars in the country, and if we all handle them well we cannot all be rewarded by an extra supply of cars. On the other hand, the opportunities for quickening the movement of freight cars are so immense that a very little improved movement will go a long way in car supply, not only in home, but in interchange traffic.

BOX CAR.

Railroad Law in August.

The following abstracts cover the principal decisions, handed down by the Federal courts in railroad cases, during August:

"*Last Chance Doctrine.*"—The rule of law recognized by some courts which makes a railroad company liable notwithstanding the negligence of the injured person—such negligence ordinarily defeating his recovery—if the operatives of the train could have prevented the injury, notwithstanding such negligence is not a rule without exceptions. It is without application to a case where the person injured at a crossing deliberately drove upon the track in the day time immediately in front of moving cars which he could have seen in the exercise of ordinary care, and the circumstances were such that the trainmen were justified in believing that he did see the cars and would stop before reaching the tracks, and when it was discovered that he would not stop it was too late to stop the train. Illinois Central Railroad v. Ackerman, 144 Fed. Rep. 959.

Railroad Aid Bonds.—A county having contested the validity of railroad aid bonds, first in a suit to compel this issuance in a State court and again in the Federal court, in a suit to recover the contents of coupons on the bonds, is concluded by the judgments rendered in these suits, and cannot again raise the question of validity in a proceeding to compel a levy of tax to pay the bonds. Estill County, Kentucky, v. Emory, 144 Fed. Rep. 913.

Injuries to Mail Clerk.—A mail clerk while engaged in the performance of his duties in that capacity is regarded as a passenger, and a railroad company is held to a higher degree of care in his transportation than though he were a servant. In case he is injured, the mere happening of the accident raises a legal pre-

sumption of negligence against the company, which it must disprove. Southern Pacific Co. v. Cavin, 144 Fed. Rep. 348.

Bills of Lading Not Necessary.—An oral contract of shipment, in the absence of fraud or imposition when susceptible of proof, is as obligatory on both the carrier and shipper as a written one. Hence, a shipper seeking to evade a condition in a bill of lading limiting the value of the shipment in consideration of a reduced rate, cannot urge that the bill was not signed as a reason for his contention. Neither can he claim that his servant who accepted the bill did not read the condition limiting the value, where such shipper accepted and rated on the bill given his servant. Missouri, Kansas & Texas Railway Co. v. Patrick, 144 Fed. Rep. 632.

Property Taken Without Condemnation.—A property owner whose property is appropriated by a railroad company without right, who sues the company for the value of land so taken, is bound by his judgment in such an action and cannot reopen the matter as against a railroad company purchasing the railroad at foreclosure sale. Zimmerman v. Kansas City Northwestern Railroad Co., 144 Fed. Rep. 622.

Safety Appliance Act.—A terminal company receiving cars of coal coming from another state and delivering them within its yards to the engines of a railroad company, is engaged in moving interstate commerce within the safety appliance act. Under this statute it makes little difference whether the car contained at the time any commodity being carried as freight or not, if the car was one being used for that purpose. United States v. Northern Pacific Terminal Co., 144 Fed. Rep. 862.

Unauthorized Use of Hand Car.—The principle that an employee is not liable for the wrongful acts of his servant outside the scope of his employment, though the servant at the time is using facilities belonging to the master, is applied in a case where a gang of construction hands used a hand car after working hours, and on returning after dark without a light collided with another hand car rightfully on the track, and injured a person on this car. It was held that the railroad company was not liable under the rule. St. Louis Southwestern Railway Co. v. Harvey, 144 Fed. Rep. 806.

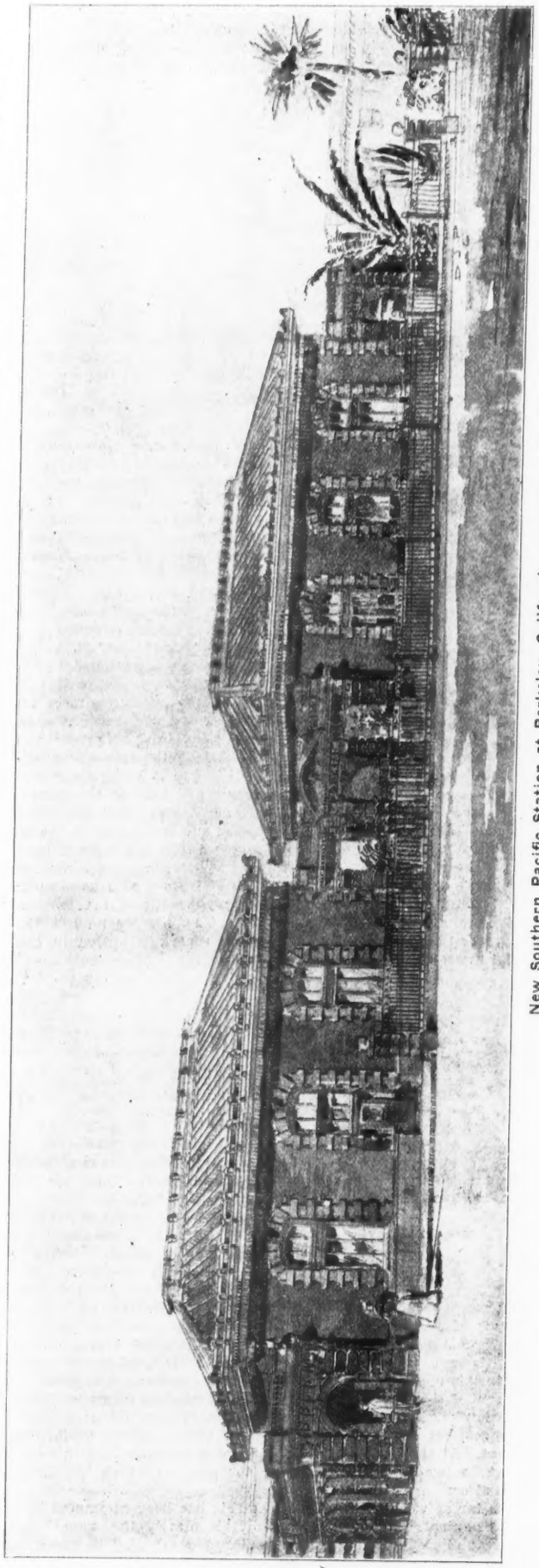
Garnishment of Interstate Carrier.—The mere fact that an indebtedness due to a non-resident railroad company arose out of interstate transportation does not exempt such railroad company from garnishment under a foreign attachment. Johnson v. Union Pacific Railroad Co., 145 Fed. Rep. 249.

Private Car Companies.—Private car companies, though not strictly common carriers, occupy such a relation to transportation that the conduct of their business may operate to impair uniformity of rates and are therefore subject to the jurisdiction of the Interstate Commerce Commission under the Elkins Act. Interstate Commerce Commission v. Reichmann, 145 Fed. Rep. 235.

A Question of Pleading.—It is not necessary under the Missouri statute, which makes railroad companies liable for damages caused by the negligence of "any officer, agent, servant or employee while running, conducting or managing any locomotive, cars," etc., that the injured person in his declaration for damages should allege in terms that the negligence was that of an officer, agent or servant. The statute will be satisfied by a bare allegation that the negligence was that of the company in running a locomotive or cars. Chicago & Alton Railway Co. v. Cox, 145 Fed. Rep. 157.

Southern Pacific Station at Berkeley, Cal.

The new Southern Pacific passenger station at Berkeley, Cal., for which plans and specifications have just been prepared in Assistant Chief Engineer J. H. Wallace's office, in San Francisco, by Architect D. J. Patterson, show that the college town where the University of California is located will at last have a station in keeping with the fine architecture of the adjoining structures on the campus. The bulding, which is of French Renaissance design, consists of two wings, being 190 ft. in extreme length and 41 ft. wide with an arcade 11 ft. wide extending along the west front and both ends. The color scheme of the structure is red pressed brick, light buff terra cotta trimmings and copper roof and cornice. The arcade is in the Doric order, made of reinforced concrete covered with terra cotta. The cost of the main structure is estimated at about $40,000 and the remaining area of the two blocks devoted to the station grounds will be appropriately parked. The north wing contains the smoking room and baggage room. The south wing contains a waiting room, ladies' retiring room and the ticket office. Between the two wings is a grass plot with cement walks and a fountain. The surrounding grounds will be arranged with additional grass plots and cement walks. The interior of the waiting room, which is 45 x 25 ft., with a 23-ft. ceiling, is to be finished in light buff brick and terra cotta trimmings and to have an elaborate terra cotta fireplace with an ornate hammered copper hood at one end. There will be panel designs in the waiting room by a famous sculptor, executed in terra cotta by local manufacturers. The insignia of the Southern Pacific, in terra cotta, will adorn one of the end walls and a handsome clock will be placed on the opposite wall.



New Southern Pacific Station at Berkeley, California.

The roof is designed so as to display some handsome exposed wood work with beamed ceilings in the waiting room.

The illustration was obtained through courtesy of D. J. Patterson, Southern Pacific architect.

Relation of Warehousing to Transportation.*

If the church bell drew the people like the dinner bell, and a freight car were emptied like a passenger car, I would enter the ministry, for preachers would then be in great demand, while cars would, in my generation, be superabundant, and the term "car demurrage" be obsolete. Ideal, you say? Yes, both of them, and practically impossible of attainment, but both teach a lesson by contrast. Necessity compels response to the dinner bell, but not to the church bell, while inanimate objects cannot unload themselves like passengers, and yet, to refuse to approximate the ideal is to content ourselves with present conditions instead of aspiring toward a commercial or other sort of paradise.

A few years ago, we heard much of "over-production" of cereals, fruits and other products of the farm, but such a statement to-day would be considered an absurdity. Transportation facilities and scientific system of storage have made it practicable and profitable to care for any temporary surplus of agricultural productions. The oldtime method of storing cereals on the premises is out of date. Farmers to-day in the United States are sowing millions of acres and reaping billions of bushels, and it is a practical impossibility to market such a crop immediately. Therefore, the imperative necessity for storage facilities and the development of the elevator system, in which regard America already exceeds any other country in the world. When will the great staples of the manufacturing world, such as coal, iron, steel, copper, tin, lead, lumber, etc., be likewise scientifically stored and systematically used? The answer is, when necessity compels it. These articles are the basis of all manufacture—non-perishable, and can be stored at trifling cost as compared with agricultural produce.

Taking the country and commodities as a whole, we find that production and transportation have outrun consumption and reservation, in other words, we produce and transport faster than we consume and store. Her annual commercial surplus is America's white elephant. The wider the margin between production and consumption, the greater the tax upon either transportation or reservation. How shall accumulations be preserved and future necessities be provided for? An abundant harvest must not be prodigally consumed or wasted, but, rather conserved and stored for future trade or prospective need. Joseph in Egypt filled storehouses during the seven years of plenty to tide over the expected seven years of famine. In times of antiquity, the shores of the Adriatic, the Mediterranean and of Italy vied with each other as storage centers, for the commerce of the Orient. Many ancient cities maintained public stores to prevent destitution and the extortion of scarcity prices. In our own arid west, the government is redeeming that barren waste by the storage of surplus water during the rainy season and the distribution of it later along, so that the Great American Desert may blossom as the rose. An up-to-date farmer stores ice in the winter that his summer fruits, vegetables and dairy products, may be kept from deterioration and be more profitably marketed. A modern city could scarcely exist without cold storage plants for its surplus perishable products. This is the day of the refrigerator, the elevator and the reservoir. Vessels by the hundred ply the ocean carrying thousands of carcasses and all kinds of produce in cold storage; a modern hotel has its refrigerator plant as a part of its equipment, while every town, village and side track has from one to dozens of elevators, for grain held for speculative purposes or awaiting transportation. In the storage of perishable goods and grain, commendable progress has been made and this process must be extended to the raw materials and finished product of individual industries.

Warehousing in the United States is far behind that of foreign countries. The Imperial Bank of Germany has fourteen warehouses of its own for merchandise deposited with it as collateral. The bank seems to have gone into the three ball pawnbroking business on a large scale. On account of lack of available storage facilities in this country or the high rates charged, instances are cited where goods have been shipped across the ocean, stored abroad and returned when needed, and money saved. The use of cars at our seaboard for the storage of export grain must stop.

A ship or train is simply a warehouse in motion, but how differently the two are treated upon arrival at destination! Marine rules are seemingly inexorable and no one is ever rash enough to combat them. Vessels are tor transportation and bankruptcy would face the man who would consult his convenience as to the removal of the lading. If he has a ship and a car, too, he lets the car go and unloads the cargo. Marine demurrage is exorbitant and prohibitive, while car demurrage is nominal and permissive, nor has marine insurance its counterpart on rail. The unloading of vessels is immediately performed and the cry of "No place for the goods" is never heard, while the unloading of cars depends solely upon how long the railroads and the public will permit them to stand loaded. Railroads should be required to get out of the storage business, to eliminate from their professional vocabulary the terms "storage," "storage period," "storage freight," etc. The public, on the other hand, must stop urging an extension of "free time" and demand that railroads stick to the transportation business and allow others to engage in the storage of goods. Whenever involuntary warehousemanship is forced upon railroads, their demurrage should correspond to marine demurrage and be sufficiently remunerative to compensate for the interference with public service.

It is only within comparatively recent years that railroads commenced charging demurrage. Their unwholesome zeal for tonnage caused them to ignore the weighty question of how such tonnage was to be handled by shippers, and the infant evil of free car storage grew to gigantic proportions, before any systematic effort was made to overcome it. The shipping public have not yet grasped the eternal truth that they are perpetuating an insidious and death dealing system when they countenance and encourage storage in cars; death to the whole commercial interests of society. Cars cannot be built for use without limit, nor can tracks upon which they run. Even with subway, surface and elevated, the desirable metropolitan spots of earth are inadequate upon, under and over which, to store the commerce of our cities. Warehouse space, on the other hand, is not limited to three stories, but can reach below and above terra firma as necessities may require.

The year 1905 was a production record breaker. In grain alone the farmers produced an ordinary wagon load for every man, woman and child in the United States. The railroads, lake freighters, canal boats, and ocean liners, moved masses of food stuffs to the markets of the world, while the country elevators groaned and their sides bulged. Did the consumer, because of this condition, care for an increased volume? No. Did he build bins, rent sheds and hasten the release of cars? No. Did he even use his available storage capacity to its limit? No—it was a few cents cheaper to use direct from the car than to elevate and back again. What did he do? He petitioned the legislature to pass laws to compel the railroads to furnish more cars, to haul them faster and to grant him the great American privilege of holding them longer without charge. While grain dealers have outstripped all other interests in the storage of their commodity, yet their customers—the consumers—have done nothing but kick, and knock and petition and continue business from hand to mouth or from car to hopper.

It is not a question of transportation that is afflicting America's commercial interests to-day. Railroads have equipment and facilities for transporting all the business that can be offered, provided, after transportation has been completed, their cars are immediately released for further service. And by this term "immediate" I mean only such diligence as is exercised in unloading vessels. It is very much easier to unload from cars than from the "holds" of ships: the mechanical appliances are more numerous and the opportunities to use them less circumscribed; for instance, coal, ore and similar freight may be unloaded by dropping car bottoms or turning the car upside down, while from vessels such commodities must be removed by "grab" or clamshell buckets, a few tons at a time, or in the case of metals, by lifting magnets through the aid of electricity. The devices for handling materials are so numerous, ingenious, simple and inexpensive, and their use so beneficial in releasing cars, that failure to install and use them is both a public and a private shame. From gravity, side hill and trestle systems, which require no machinery, to the most elaborate moving-platform, link belt, electrically operated plant, the one result is obtained, namely—the "immediate" unloading of cars.

For how many long years have we listened to the wail that soft coal could not be stored in quantities without danger of fire from spontaneous combustion. The docks at Lake ports could contain thousands of tons in one pile, but the "poor consumer" must hold his reserve supply in cars for first, he has no place to put it, and second, it would vitiate his insurance if he had. Such lies have been repeated until they were believed. But hark! There was a rumor of a coal miners' strike April 1. What became of those combustible fears? They vanished into thin air from whence they came and the early part of 1906 saw more soft coal stored by consumers than ever before in the history of this country. How long will industries remain dependent upon scarcity conditions? General prosperity requires that the basic materials of industry be accumulated far enough in advance to prevent scarcity and scarcity prices. Were this the practice, such a thing as "a corner" in markets would be all but impossible.

The Interstate Commerce Commission has decreed that there shall be no discrimination or elasticity in the time allowance for the removal of goods from the railroad company's possession; that it must state in their tariff the time to be allowed and enforce the rule uniformly. It is self-evident that more cars will be required

*From a paper read before the St. Louis Railway Club by Ashley J. Elliott, Manager Illinois & Iowa Car Service Association.

to move a given quantity of freight in a given time, if delays at destination are permitted, and more cars mean more expenses—which is always reflected in the rate—but over and above all that, it means more congestion at terminals, which is the real difficulty now, and more cars would simply aggravate rather than remedy this objectionable condition. Liverpool tells us how hungry the world is and how much is needed to satisfy its appetite, and how much will be paid in exchange for being fed. The potent factor of morning quotations governs largely the time of seeking transportation. If the price is right this morning and 100 Iowa farmers accept the bid of one Chicago consumer and cars are promptly furnished, the trouble will arise at destination unless that consumer has facilities for unloading in one day, all that is shipped to him by those 100 farmers in one day. The cry for more cars for shipment to an industry already congested, means the withdrawal of that many more cars from service. Manufacturers buy when goods are cheap, and then play and pray for long time for unloading. Railroad equipment must not be used for storage purposes and those concerns which are amply equipped to handle their receipts promptly, and all representatives of interests which do not delay cars, should join hands with those who are seeking to curtail the abuse and to enhance the legitimate use of these vehicles of commerce.

It is sometimes argued that the government will take the railroads if they are not more lenient or "the goblins 'ill git ye, ef you don't watch out." It is interesting to note that the government already owns one railroad and that it charges $5 a day demurrage after 48 hours, without any so-called reciprocal rate for delays in transportation.

English Electric Lines.

The attitude of most of the English railroads toward electrification has been one of waiting for the accumulation of evidence of its practical working on the lines which had applied it to certain sections—the North Eastern, the Lancashire & Yorkshire, and perhaps the Metropolitan & District. Either the evidence now obtainable is considered sufficient or else the necessity for abandoning the watching attitude has been realized, for there appears to be a decided disposition on the part of leading companies to electrically equip short experimental systems for themselves. Both the Midland and the London & North Western are cases in point.

It was mentioned with regret in a paper read before the British Association for the Advancement of Science that there was even yet no example of single-phase railway operating in the United Kingdom. The London, Brighton & South Coast contract has been finally settled, and the work of equipping the Battersea Victoria section will be taken in hand in September, but it will be a long time before this single-phase system will have been in full working sufficiently to admit of a fair comparison being made with the third-rail direct current lines now running in London and in the North. Foreign single-phase experience and the disadvantages of surface rail direct current have promoted a pretty general feeling in England in favor of alternating current working, notwithstanding that there is no English line so operated. The decision of the Midland to electrify its seven-mile line between Lancaster and Heysham Harbor with single phase will have due weight; the electric service will be run purely for local traffic, and will take the place of an existing service of steam rail motor cars.

It has now been announced that the London & North Western will electrically equip a railroad from Euston out to Watford, but it is not yet settled what system will be adopted. Like others, this company has for years been perplexed to know how to relieve its main lines of some of its suburban traffic, and also how to develop the latter. The proposed electric line is intended to help achieve both objects. The railroad will run partly alongside and partly under the present main line, with a loop and local station under Euston terminal; it will serve not only the existing suburban stations but also several additional ones along the route. This it is expected will relieve the main lines of much suburban traffic; will improve the service from Watford to Broad street; will give additional facilities for long distance and goods traffic; will relieve the heavy pressure at Euston station, and will enable inter-communication to be effected with the London tube railroads.

The electrical lines of the Lancashire & Yorkshire Company in the Liverpool district are being extended. What was formerly only a goods line between Seaforth and Aintree has now been electrified, and a passenger service is being run. The company is now engaged in electrifying two more lines between Liverpool and Seaforth, and will shortly similarly convert the length from Aintree to Sandhills, via Walton Junction. Thus there will be a complete circular electric service from Liverpool to Aintree, via Seaforth Junction, and back to Liverpool by Walton Junction.

The North Eastern electrified service in Newcastle neighborhood continues to be successful from a traffic point of view. During the past half year 300,000 more passengers were conveyed than in the first half of 1905, but the actual electric passenger train mileage run has been reduced; the electric goods train service has been greatly increased. The North Eastern is doing good service with its rail motor cars, petrol electric and other. There is a demand for light railroads in some parts of the area, but the prospective traffic would not warrant such, so the motors are run as a substitute. The rail motor car services are not regarded by the company at present as profit earning, but considerable importance is attached to them as a means of retaining the public favor in the localities concerned.

The experience of the Liverpool Overhead electric continues to be sadly disappointing. Municipal tramway competition, and the improved electric service of the Lancashire & Yorkshire combine to reduce its traffic, and a rearrangement of fares to make the line more attractive has only resulted in less traffic and a fall in the receipts per passenger. The interchange of traffic with the Lancashire & Yorkshire has also been disappointing.

Turning now to the London tube lines, we find that motor omnibus competition and the improving electrical conditions of the Metropolitan District are having an effect not only upon the immediate traffic returns, but also and partly in consequence upon the market value of the stocks, a fact which prejudices the chances of obtaining more capital from the public. The Great Northern & City extension inwards to the city at Lothbury, though a very promising project, which would place its terminus in the very heart of city traffic, is still hanging fire awaiting an opportunity to raise the necessary funds. The business of the railroad is now satisfactorily increasing and this may help in the desired direction, though the electrification of the northern tramways of the London County Council which is now proceeding may hinder. The Great Northern & City service of electric trains is to be altered during the coming winter, giving a two, instead of a 2½, minute service at rush hours; the midday service will be 3½ minutes. The City & South London is getting on with its extension to Euston, after delays due to rock being encountered and other causes. For the past 16 years the company has suffered from not being able to take its trains out of the tunnels for adequate cleaning. They were drawn by means of a steel cable, up a very steep incline at Stockwell, a proceeding which was not only costly but was most unsatisfactory because it led to stoppages and other troubles. This old arrangement is now to be abandoned and sidings are to be made instead. A large shaft has been sunk in which a lift will bring the cars up to the surface for cleaning at the depot.

The Metropolitan District, now that it is electrified, is drawing back some of that traffic which was taken away by the Central London. We believe that one important cause is the dislike of the public for using the lifts on the deep level lines, not, of course, because of any fault in the lifts themselves, for they have given little cause for complaint, but because a flight of stairs down to the District is preferable to waiting for lifts to fill, and losing trains. The Central London is spending money upon a good deal of additional machinery for its post office substation, and also at its generating station at Shepherd's Bush, as the available margin of power is not sufficient to ensure certain continuity of supply.

The Bakerloo expects its section between Baker street & Edgware Road to be opened by the end of the year. This section, together with altered fares, may improve matters. It is expected that the Great Northern, Piccadilly & Brompton tube will be completed in January. The tunnel, permanent way, and conductor rail work is practically ready, and all the sub-stations are running save one. The cars are now being delivered ready for equipment at the Lillie Bridge car sheds.

The Metropolitan Company will not realize the full benefits of electrical working until the steam trains are entirely removed. The chairman of the company attributes the various electrical breakdowns to the character of the controllers in the motor cars, and these are being taken out and replaced by another design which is said to be better adapted to the conditions of the service. The Metropolitan District also is still in trouble. Though it has added 18.40 per cent. to its traffic during the last half year, and $72,270 to its receipts, its working expenses increased by 45.29 per cent., or $260,165, through running a more frequent service (the train mileage increased from 815,667 to 1,199,569, or 47 per cent.). A revision of fares and economics in working are promised.

The London, Tilbury & Southend Company, which has been taking its supply of power from the District power station at Lots Road Chelsea, is talking of dispensing with that supply and putting down its own generating station.

Foreign Railroad Notes.

According to the *London Times*, John D. Rockefeller has furnished funds for railroad building in Tanganyika, Africa, a district which has been greatly hindered by lack of railroad facilities.

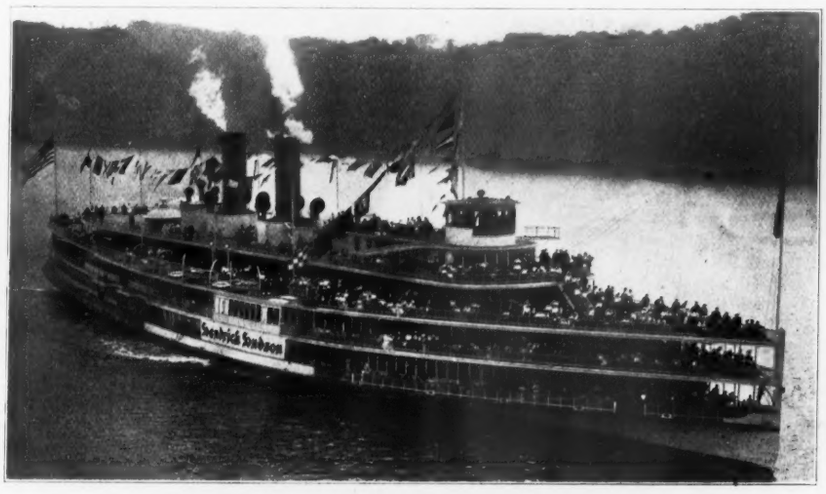
It has been announced at Tokio that Japan, probably as a counter demonstration against the dominance of Russia in Siberia, is planning to double-track the railroad from Dalny to Mukden.

The "Hendrick Hudson."

The new Hudson River Day Line steamboat "Hendrick Hudson" made her inaugural run from New York to Albany on August 20, 99 years, lacking three days, after Robert Fulton began the trip from New York to Albany in the "Clermont." The "Clermont" went up the river August 17, 1807, and returned on the 21st of August, so that the return trip of the "Hendrick Hudson" was made on the ninety-ninth anniversary of the completion of the "Clermont's" voyage.

The new steamer is 400 feet long, 82 feet broad, and draws only 7 feet 6 inches. There are six decks, and the framework of the vessel is of steel. She was designed by Frank E. Kirby, assisted by J. W. Millard, and the W. & A. Fletcher Company, of Hoboken, were the general contractors for the vessel. The hull was built by the T. S. Marvel Shipbuilding Company, of Newburg, N. Y., and the boilers by the New York Shipbuilding Company, of Camden, N. J.

The "Hendrick Hudson" has carrying capacity for 5,000 passengers, and like the other vessels of the Hudson River Day Line carries no freight. The boat has many unusual features to add to the comfort of the passengers, and carries a quartette of negro singers to amuse them, in addition to the orchestra. The vessel may undoubtedly be classed as the finest river steamboat in the world.



New Albany Day Line Steamer "Hendrick Hudson."

Handling the Air Brake in Passenger Train Service.*

If the brake on any car or engine in a train is so designed or in such poor condition that it will not stop the car or engine in as short a distance as will the brakes on the balance of the train, then the latter must do part of the work of stopping this car or engine. This necessitates heavier brake applications to stop the train within a given distance, reduces the reserve braking power for making shorter stops than at first intended, increases the liability of sliding wheels and the length of all emergency stops, also the tilting of the trucks under cars with the good brakes and causes unnecessary strains in draft gear, all of which make the work of the engineer more difficult.

We cannot at all times, even by the most approved methods of operating the brake valve and maintenance of equipment, prevent a considerable variation in the holding power of the brakes throughout the train; therefore, the type and condition of the draft gear and buffers is worthy our most careful consideration and attention. The buffer springs should be of sufficient strength to take up any slack there may be in the couplers, thereby reducing to a minimum all unnecessary movements between the cars and at the same time must not be so heavy as to necessitate excessive buffs when coupling or materially reduce the slack available for starting a long train.

The best form of draft gear is one which has a limited movement under comparatively low drawbar strains to care for ordinary pulls and buffs. It should also have a gradually increasing resistance, a maximum capacity sufficient to absorb all shocks except those resulting from collisions at a considerable speed, and an absence of sufficient power in the recoil following a heavy buff or pull, to create dangerous and disagreeable shocks and strains in the opposite direction. A noticeable improvement is now being observed in the handling of trains containing modern Pullman cars, all of which are fitted with draft gear containing the features enumerated. As the number of cars so equipped is increased the result will, of course, be correspondingly greater.

To insure a comparatively uniform distribution of the brake power throughout a train we should know:

(1)—That the leverage and the remainder of the foundation brakes are correctly designed and installed to deliver the proper force to the brake shoes.

(2)—That the brake cylinders are free from leakage.

(3)—That the piston travel is correct and uniformly adjusted.

(4)—That the strength of the brake rigging including brake beams, is sufficient and the lost motion in the trucks is small enough to prevent an excessive difference between the standing and running piston travel.

(5)—That the total leverage is low enough to insure ample shoe clearance in brake release when the piston travel is maintained at the proper amount by an automatic slack adjuster.

(6)—That in releasing, the reduction of the cylinder pressure, therefore of holding power, is as nearly equal at the front and at the rear of trains as it is possible to make them.

(7)—That the triple valves and engineer's brake valves are maintained in such condition as will prevent the occurrence of undesired quick action.

The smoothest and safest service braking from speeds of 25 m.p.h. and over is obtained in the two-application stop made by applying the brakes at the beginning of the stop with the maximum force to be employed, thereby obtaining the greatest braking power when the speed is high and the results of the brake application least liable to be noticed by assengers owing to the comparatively low rate of retardation possible, releasing at about 12 to 18 m.p.h. and finishing with a moderate application, held on, on long trains, until stopped, unless the locomotive braking power is automatically retained in the final release.

The first brake application must be made at such a distance from the station as would, if held, stop the train short of the desired point. This is to permit of reducing the cylinder pressure, and therefore braking power, when the speed becomes comparatively slow, in order to prevent near the stop an excessive rate of retardation, resulting from high cylinder pressures at slow speeds; also to permit the trucks to partially right themselves and the draft rigging to assume its normal position.

The ideal method for accomplishing the desired reduction of cylinder pressure near the completion of a stop is obtained with triple valves which permit the engineer to discharge a part of the air from each of the brake cylinders and yet retain sufficient to complete the stop without making a second application, the results of which are more or less uncertain. Triple valves which accomplish this are in quite general use on electric interurban and elevated roads throughout the country and are now going into service on steam roads. Until such a time, however, as they come into more general use on steam roads it will be necessary for us to reproduce this action as closely as possible by employing the two-application method of braking. If the train is not of sufficient length to cause the slack to run out hard when brakes are released at very slow speeds and the track grade is level or nearly so that the train will stand without brakes, the brakes should be started to release just before the stop is completed in order to reduce the surge to the minimum or wholly eliminate it.

The Westinghouse Air Brake Company's Schedule ET equipment, which they are now furnishing almost exclusively for locomotives, is so designed that the engineer has absolute control, with the automatic brake valve, of the release of pressure from the engine and tender brake cylinders. The locomotive brakes are automatically retained while the train brakes are being released, thereby protecting the draft rigging against heavy jerks which follow the release of brakes on long trains at slow speeds with the ordinary form of engine brake equipment often resulting in rough stops and frequently in trains breaking in two. With the ET equipment the engine and tender brakes are retained when the automatic brake valve handle is in the release and holding positions (the latter is a new position between running and lap), and are released in running position only, unless the independent brake valve is used.

When making the first release of a two-application stop with this equipment the brake valve handle should be moved to release position as usual, but as soon as the brake pipe pressure has increased sufficiently to start all brakes to releasing, it should be moved to running position and left there about two seconds before lapping the valve preparatory to beginning the second application,

*A paper presented to the convention of the Traveling Engineers' Association by C. C. Farmer, Westinghouse Air Brake Company.

in order to reduce the locomotive brake cylinder pressure. When making the final release just before the stop is completed, the locomotive brake cylinder pressure should be retained; therefore, the release of train brakes may be started a little earlier than with other types of engine equipment, insuring the righting of trucks before the stop is completed. Final release of train brakes before the stop will be found practicable with trains of considerable length on account of the locomotive brakes being held.

The straight air brake installed on many passenger engines, in combination with the automatic, may also be used to advantage in preventing the slack running out hard when a release is made at slow speeds, but when used for this purpose should be applied moderate before the train brakes are released and handled with sufficient care to prevent shocks to the train.

When a brake release is desired on a train moving at comparatively slow speed and the cylinder pressure on the locomotive is not sufficient to prevent the slack running out hard the locomotive brake power may be increased with the ET equipment independent brake valve before the release is made, its handle then being returned to the automatic brake valve. The automatic brake valve handle should be placed in release position the usual length of time, namely, until all train brakes are releasing, then moved to the holding position and left there until the brake force on the train has reduced sufficiently to permit the slack to adjust itself, after which by moving the valve handle quickly to running and back to holding position a few times the locomotive braking power will be gradually reduced to any desired amount.

When stops are made on moderate descending grades sufficient pressure should be retained in the locomotive brake cylinders, by the use of holding position, to prevent the train from starting, as this position keeps all brakes charged. However, if the train brakes are released on ascending grades the locomotive brakes should be released by the time the stop is completed so as to prevent the slack from running back harshly. The independent or straight air brakes may be applied gradually to hold the train.

When stopping on moderate descending grades with the ordinary form of train brake equipment and the combined automatic and straight air or the ET equipment on the locomotive, the second application should be held until the stop is completed, after which the engine and tender brakes may be applied with the straight air or independent brake valve with sufficient force to prevent the train starting. The automatic brakes should then be released and recharged. Heavy applications of the locomotive brakes, with either the independent or straight air brake valves, should always be made gradually to gather the slack if the train is in motion, otherwise rough handling will result. This is particularly true if the speed is low when the application is made.

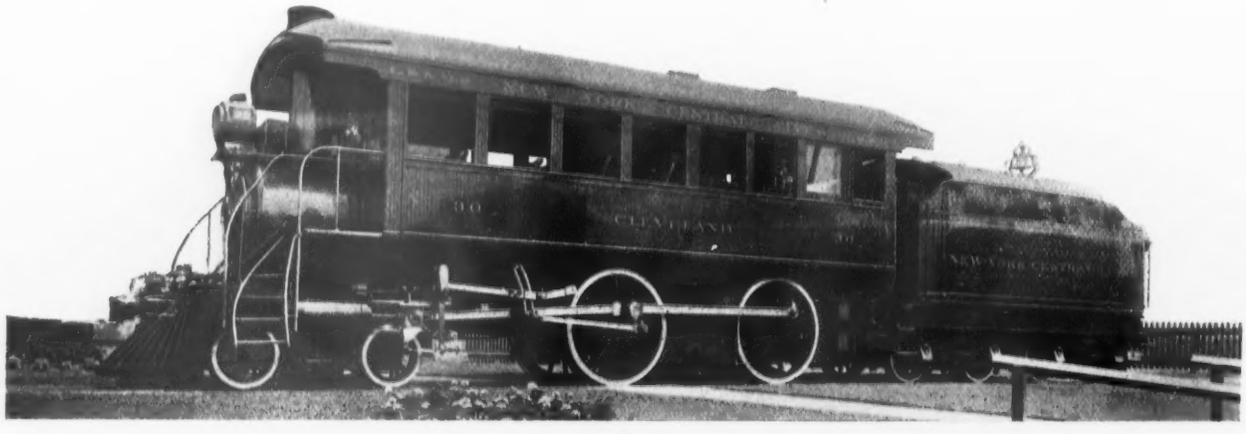
We cannot expect the uniformly smooth braking for water and coal stops that is possible at stations and other similar stops, owing to the accuracy required, but heavy shocks to the train can and should be avoided. The roughest stops made at coal chutes and water spouts are when the brakes are released at slow speeds just before the stopping point is reached, causing the slack to run out hard, and the final reduction is made in the emergency position. One of the worst features of this kind of a stop is that the brakes on the forward end of the train apply so heavily that the engineer does not feel the slack run is hard, due to the rear brakes applying moderately, and therefore, does not appreciate the seriousness of the results at the rear of the train. He should encourage advice from the conductor concerning rough handling and the conductor should give it in a gentlemanly manner without awaiting a request.

The brakes on the forward end of a long train will start to release in practically the same length of time with either a low or high excess pressure, but those at the rear end will begin to release much quicker with high excess pressure; therefore, to obtain the most uniform release of brakes throughout a long train and reduce the shocks to a minimum when releasing, a high excess pressure must be had at such times. Returning the brake valve handle from release position to running position before all brakes have commenced to release, increasing the time required for the air to flow to the rear end of the train, is more serious in its effect on the release of brakes than is low excess pressure and is frequently the cause of the slack running out hard, causing heavy jerks and break-in-twos, and of brakes sticking.

Many passenger trains have been broken in two and given heavy shocks for which the action of the brakes or the manner in which they were operated were held responsible, but which were actually caused by opening the engine throttle before the brakes at the rear end had been given time to release. It should be remembered that a few seconds must elapse before the brakes can begin to release after the brake valve handle is placed in release position and several additional seconds are required for all brake cylinder pressure to entirely discharge. If trains are to be handled smoothly and safely any error in the period of time elapsing between placing the brake valve handle in release position and opening the throttle should certainly be on the safe side; therefore, we should instruct the engineers to allow a few seconds to elapse after they think the brakes are released, as their experience and judgment shows they should before opening the throttle.

The Lake Shore Four-Cylinder Simple Inspection Locomotive.

The Lake Shore recently completed at its Collinwood shops and now has in service a new type of inspection locomotive which is of unusual interest because of its novel features. It is a four-cylinder simple locomotive with Walschaert valve gear. Detail drawings and engravings from photographs are shown herewith.

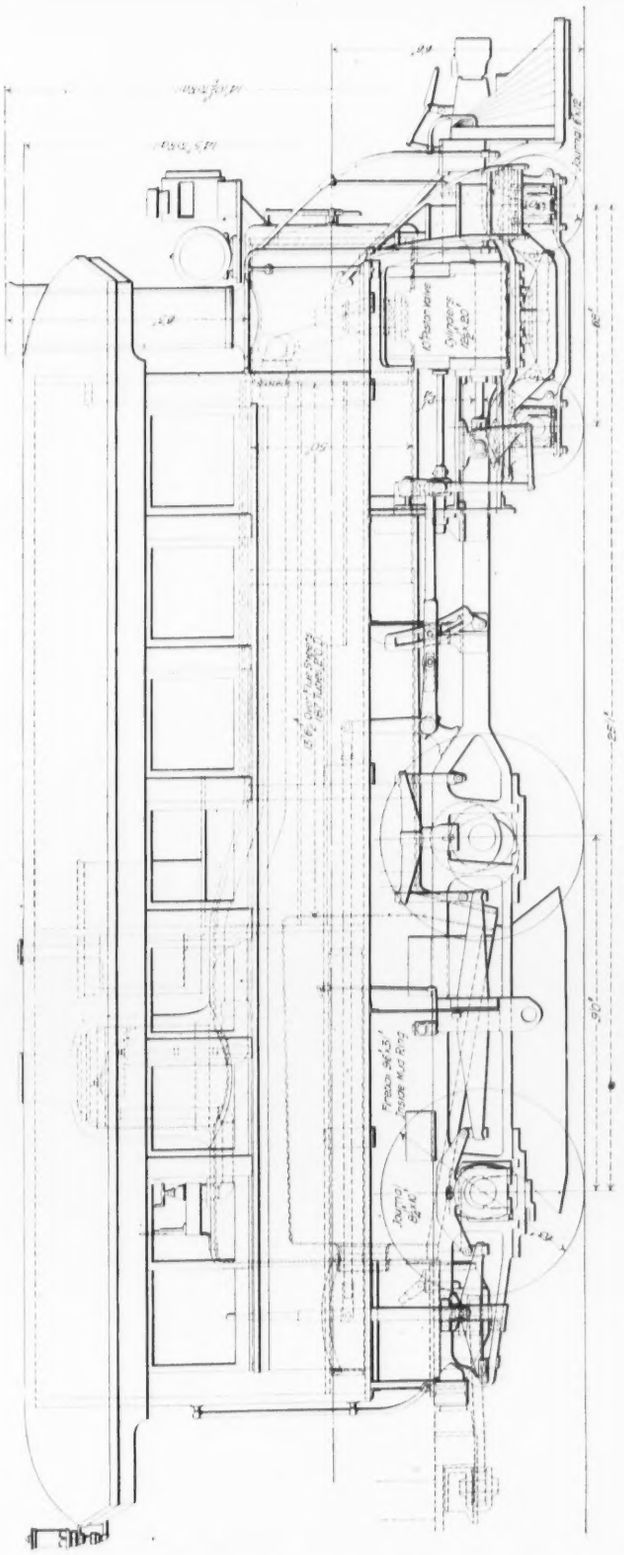


New Inspection Locomotive Built for the New York Central at the Collinwood Shops.

Easy riding is, of course, a primary requisite of a locomotive of this character, hence the use of the four-cylinder balanced principle. The engine was not made compound, however, for two reasons. In the first place there are no compounds on the Lake Shore, the road not being favorable to them. And then there was the important practical reason of restricted space in which to dispose the cylinders, considerable difficulty having been experienced, as it was, to get a satisfactory arrangement of the simple cylinders in the space at the disposal of the designers. The larger low-pressure cylinders of a compound would have added to this difficulty.

Each pair of cylinders has a single 10-in. piston valve of the type standard on the Lake Shore. In order to admit steam to the opposite ends of a pair of cylinders simultaneously it was necessary to cross the ports for one cylinder. This was done for the inside cylinder for the reason that the passages could be better heated by the live and exhaust steam. This arrangement makes the ports for the inside cylinder much longer than for the outside, but the areas of all ports are large relative to the size of the cylinders. The clearances, however, are practically no greater than for the ordinary type of slide valve engine. To equalize the steam distribution the ports are so designed as to enable the steam to have connection between the two cylinders even when the valve is over the port. The cylinders are 12½ in. x 20 in., and all four drive on the forward axle.

The design of the locomotive required a special arrangement of the Walschaert valve gear, with certain novel features. The location of the steam chest necessitated the use of the rocker arm from which the combining lever is supported. This arm is quite short



General Elevation, New York Central Inspection Locomotive.

and was made double to furnish a sufficiently substantial support for the lever. Also at the back of the radius rod an unusual construction is employed, the valve stem being operated by a cross-head arrangement on the rocker arm working in a yoke on the valve stem. Details of this rod and of the reverse shaft are included in the illustrations. All of the valve gear had to be placed low in order to go under the running boards. This necessitated working out this peculiar form of radius rod to avoid interference with the main rod.

A number of other special features of detail were made necessary by the clearance limitations. For example, on the truck the frames are dropped and a low construction employed throughout to enable it to go under the cylinders. The truck brake cylinder is fastened to the center casting, this being the only location affording the proper clearances. The wheels and axles were made by the Schenectady works of the American Locomotive Company. The crank axle is of the solid type similar to the one used on the Cole compound of the New York Central. (*Railroad Gazette*, May 13, 1904.)

The boiler is wagon-top type with 1,422 sq. ft. of heating surface. The grate area is 21 sq. ft., the firebox being 31 in. x 96 in. There are 187 tubes 13 ft. 6½ in. long. The working pressure is 180 lbs. The firebox has a Franklin automatic fire-door opener.

The tender has capacity for 10 tons of coal and 4,300 gals. of water. The tank is entirely covered over. With the old inspection engine, which has the same sort of cab roof as this, it was found that the wind coming along this roof would pick up the coal dust in the tender and blow it into the engineman's cab. To avoid this trouble on the new engine the coal space was roofed over. The tank is equipped with a water scoop.

The interior of the cab is finished in mahogany, inlaid, presenting much the appearance of the latest passenger coaches. A runway 5 in. wide is provided on each side of the boiler for the convenience of persons moving along the cab when it is occupied. The space beneath the runway is utilized for steam heat. There is a large locker at the rear of the cab and a small locker at the front between the windows for stationery. It is designed to carry different sizes of stationery as well as pens, ink and pencils. A man sitting on the right-hand side of the cab at the front has the following equipment in easy reach: Air signal, conductor's brake valve, an air-controlled valve for blowing the steam whistle, and a push button for electric signals to the engineman. In front of him is a Pullman folding berth lamp, which opens and lights by pressure on a push button. This is for reading messages or train orders at night. When not in use it is kept closed, as the front cab must be kept perfectly dark on account of the engineman. There is also a Boyer speed recorder and a clock at the front of the cab. There are eight chairs in the passengers' cab, one for each window. There is also room on the flat-topped boiler casing for a number of persons, the runway serving as foot rest. The engineman's end of the cab is also finished in mahogany, with the usual seats, and there is also a large clothes locker attached to the partition between the two rooms. The engine has an electric headlight.

The total weight of the engine is 126,600 lbs., of which 85,100 lbs. is on drivers. It was built from designs prepared by Mr. H. F. Ball, formerly Superintendent of Motive Power, and Mr. R. B. Kendig, Mechanical Engineer. We are indebted to Mr. Kendig for the data for this description.

Philippine Labor.

BY L. E. BENNETT.

Many accounts of the performances of Filipinos as laborers have been written, showing them in a most favorable light. These have, we think, for the most part been the work of persons interested in Government contracts actuated by the ulterior motive of saying something flattering to please the Government authorities. On the other hand, a great many writers have taken the opposite point of view in such a way as to make it appear that the Filipinos are hopeless as laborers and otherwise quite worthless. The truth probably lies between these extremes.

It is proposed in the present treatment to outline a conception obtained at first hand of the assets and deficiencies of the native Filipino as a workman. The writer has had 4½ years' experience in dealing with the Philippine labor problem, and most of that time has directed engineering works on which considerable numbers of natives, as well as Chinese and Japanese, have been employed. In this way a basis of comparison has been afforded.

It is quite as difficult to generalize regarding native labor throughout the archipelago as it is to generalize concerning the labor problem in any country where there exist side by side marked racial distinctions. There is, moreover, a decided variation dependent upon locality and environment. Nearly all that has been written thus far on the subject applies solely to the labor situation in and around Manila, where the foreigner has had the best opportunity for observation.

Now the labor conditions at Manila are the most favorable in the islands, excepting Cebu and Iloilo, so it is not fair to take them as a criterion for the whole of the Philippines. Then, again, there is the distinction between municipal and rural element in the laboring class quite as marked as is to be found anywhere. In Manila, Iloilo and Cebu those conditions obtain which are characteristic of nearly all large cities. The poorer class of natives must either work or starve. On the other hand, in the rich farming provinces, food is plentiful, shelter and clothing may be almost entirely dispensed with, and there is little incentive to steady and regular work. It is the difficulty common to all tropical countries.

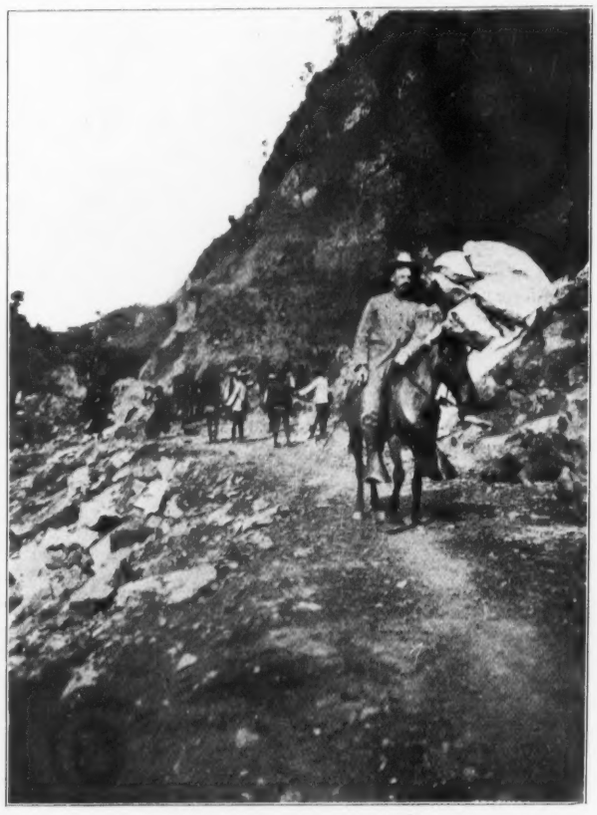
In certain of the more thickly populated provinces of Luzon,

such as Ilocos, Tarlac, Pangasinan, Batangas and Laguna, there holds, however, to a certain extent the necessity of working to live. Here then is found a good labor supply, and public works on a large scale can be undertaken with full confidence that the labor demand may be filled. These conditions obtain also in the large Visayan Islands, Cebu, Negros and Panay.

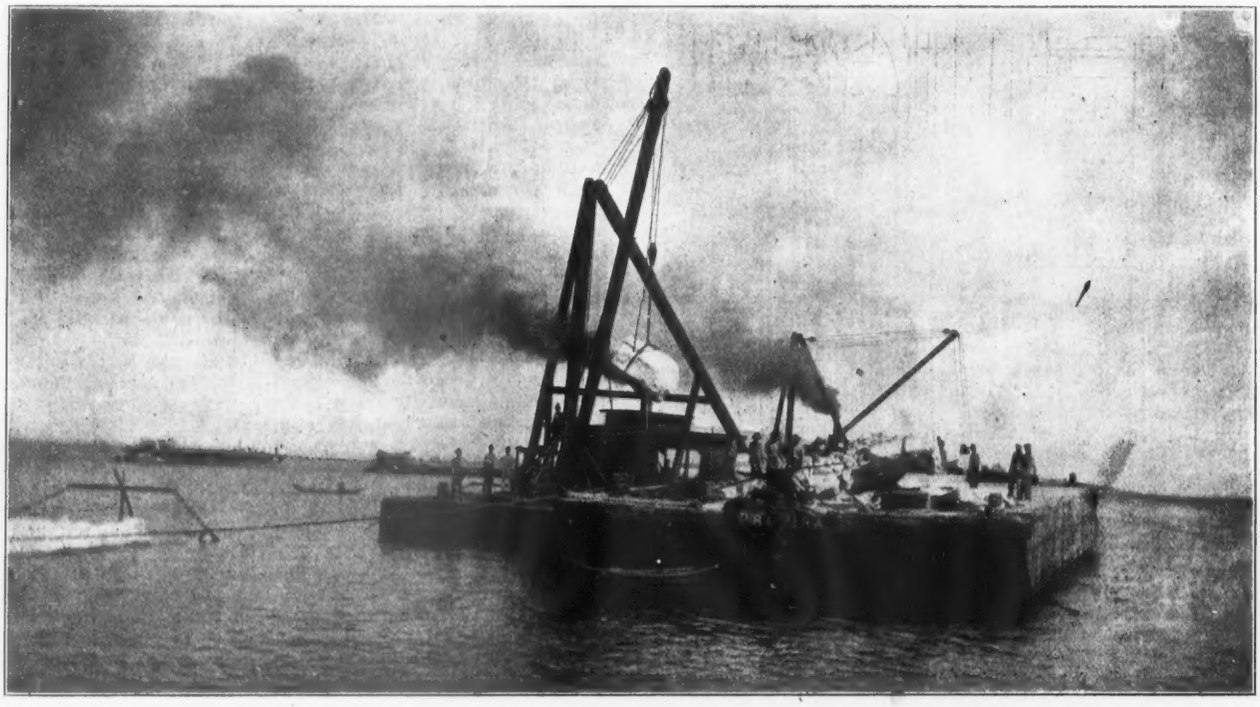
The abundance of labor supply in the centers of population is testified by the success which large engineering companies have met with on certain works. Messrs. J. G. White & Co., of New York, have recently completed elaborate harbor improvements for the Government at Iloilo and Cebu in the Visayans, while the Atlantic, Gulf & Pacific Co. has carried out similar undertakings at Manila and Cavite. In railroad work the Manila & Dagupan Railroad has built and now operates 200 miles of steam line. Dependence is placed almost entirely upon the natives, even the engine drivers, section foremen and telegraph operators generally being Filipinos. However, the main line passes through a thickly populated district where labor is plentiful and it is hardly to be expected that the same success would be met with in continuing their line northward, as has been proposed by the Government, into Isabella and Cagayan provinces. In fact, the railroad has constantly refused to bid for contracts for the construction of these extensions, and it seems probable that the deterring factor is the fear of difficulty with labor.

Besides the Manila & Dagupan there is one other modern traction system of magnitude in the islands. This is the Manila Electric Street Railway, in the building and operation of which dependence was placed, as with the steam railroad, almost entirely on natives for the rank and file. J. G. White & Co. were the engineers and contractors for the entire plant, and the operating department of the same organization is responsible for the operation of the property, which is the most extensive electric traction and lighting system in the Far East. Service was inaugurated in April, 1905, and the property began to earn dividends the first of 1906. In thus establishing the system on a paying basis within the first year, the Filipino operatives have aided materially. All the motormen and conductors are Filipinos, and give considerable satisfaction considering the exacting conditions of the service, which is much more exacting than is characteristic of electric street railway service in western cities.

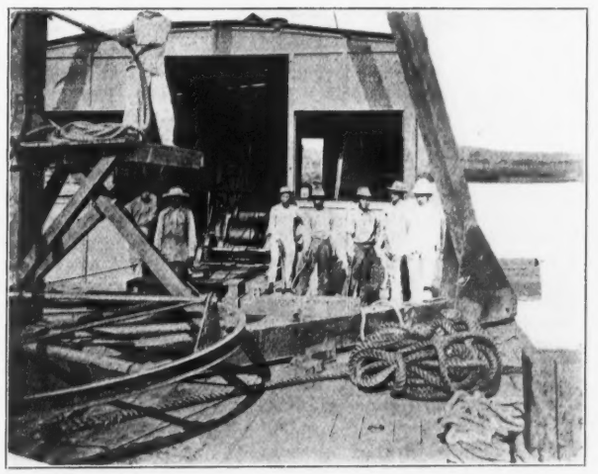
As applied in various fields of industry, there seem to be marked distinctions under the general topic of the adaptability of Filipinos to the use of modern mechanical appliances and tools. The quality of receptiveness in the field of engineering enterprise contrasts oddly with the predilection for old methods and antiquated tools in the agricultural vocation. It may be, however, that more general contact with foreigners in the latter field will ultimately develop the state of affairs existing in the former. Filipinos taken from rural environment where they have been accustomed to use the most rudimentary mechanical implements, quickly learn to operate not only steam and electric railroad machinery as above noted, but also construction auxiliaries such as pile drivers, cranes and dredges. I have seen this quality strikingly demonstrated in connection with the construction of the jetties and sea walls and the extensive dredging being carried out at Iloilo and at Cebu. It must be admitted that a quick wit and a steady nerve are requisite in the operator of a hoisting engine and his co-workers when setting large blocks of stone accurately in place on sea wall construction, even in still water. When the ele-



On the Route of the Benguet Road.



Placing First Course of Rubble Wall in the Harbor of Iloilo, Panay.



Native Laborers on a Floating Derrick.

ment of motion of the derrick floats is introduced, however slight it may be, there is a demand in addition for great patience.

I have seen a gang of natives perform under this combination of trying conditions, calling for alertness, steadiness and patience with quite as great efficiency, under the direction of a white foreman, as would have been displayed in the same situation by an average gang of white workmen. These native workmen were Visayans, who are rather less excitable and generally more trustworthy than other natives of Malay extraction such as the Tagalos, Macabebes and Moros. It is thus fortunate that the first elaborate work of railroad construction will be undertaken on the Visayan islands. In this work J. G. White & Co. will place reliance for the bulk of the labor on natives, who will be engaged to the number of nearly ten thousand before the construction is completed. It is planned, moreover, once the work is fairly launched, to eliminate all racial distinction so far as possible in the organization, first of the engineering and construction corps and later of the operating staff. The grade of the office will be immaterial. This impartial plan of action should do much toward inspiring the natives with a national loyalty irrespective of its virtue as an industrial educational institution.

The question seems to resolve itself in any case, largely into a matter of careful tuition by competent foreigners. It is difficult to account otherwise for the performance of the employees of the Manila Street Railway, because the native sometimes exhibits characteristics quite the antithesis of steadiness, tact and resourcefulness.

In certain rural districts where foreign influence has not been brought to bear directly, and where conditions of life are easy, as previously noted, the average native is a shiftless ne'er-do-well and absolutely childlike in his lack of balance. To work and accumulate property rarely plays any part in his estimate of the requirements of life. If a native, for example, by some windfall should suddenly come into the possession of an unwonted sum of money, the chances are that instead of buying something useful, a little furniture, a little respectable clothing, and perhaps a good farm animal or two, he would take his children to the Chinese trader and purchase a lot of cheap finery, and then he might give a dance or celebration of some sort to commemorate the anniversary of the death and burial of some relative whose demise was conveniently coincident. In any case, he would reserve a goodly portion of the whole to bet on the cock fight, for he is a born gambler, and lastly he would feel that he was well repaid for the dissipation of his inheritance merely by the pleasant memory of a good time while it lasted.

Superstition and suspicion are among the characteristics of the raw and untutored laboring element, and only at the expense of much patience, time and money, is it always possible to effect a transfer of labor from points of abundant supply to points of demand. They have a deep rooted objection to working and to travel where they have not before worked or traveled. Unfortunately the weaknesses of the ignorant natives are made stock of very frequently by unscrupulous native Government officials, much to the detriment of the interests of the Government and those honestly trying to advance the cause of civilization.

In the name of the Government at Manila these local officials sometimes levy upon the people, appropriate their farm animals and force them to work or perform some service for the personal benefit of the official himself. They give insufficient remuneration or nothing at all, declaring then that the service performed is compulsory for the Government and there is no pay available. The ingenuous victim accepts these statements verbatim, and comes consequently to regard the Government with a cordial hatred.

There is, however, a strong element of good opposed to the corrupt tendency among native administrators. I was once able, through the assistance of honest native officers to frustrate the efforts of a dishonest town council in Northern Luzon, which was plotting to defraud the Government of a sum set aside for road construction under that appropriation known as the "$3,000,000 Congressional Relief Fund."

Surfacing Track in Cebu.

The well wishers enabled me often to anticipate difficulties before they arose, thus greatly ameliorating them. It was my pleasure to meet on another occasion the presidente of an interior town, who devotes all his personal salary as mayor to the support of a school in his town. Again, at Iloilo, the Governor, Senor Melliza, a full blooded native Filipino, is a most honorable and intelligent official, who knows his people and does only what is best for their interests, without regard to personal gain. He has been, and will doubtless continue to be, of the greatest assistance to organizers of industrial enterprises in his province.

The childish innocence of the average native has already been touched upon. Too great precaution we could never take in providing against disaster from this source. When working in the interior we frequently lined up our corps of laborers half a day before starting for the mountains, and had their own foreman give them a personal lecture, explaining that they were going where there were no stores, that they could buy no tobacco, salt and other necessities, and that only their houses and staple foods would be provided by their employers, so they must

Mixing Concrete for the Manila Street Railway Power House.

go beforehand and buy all these small articles. Every man was asked if he understood the situation and answered in the affirmative. Upon arrival at their new work it turned out that not 10 per cent. of them had provided themselves as we directed and were crying and complaining like children, and asked to be sent back. Generally we have found the natives very obedient and easily handled as long as they are kept away from native agitators and the malign official influence. Moreover, they are generally sober and respectful and most of what appears to be dulness on their part when working under American foremen is in reality only inability to understand what the foreman wants done, due to confusion of dialects. Illustrative of their obedience, if the foreman were to tell the gang of laborers to go and steal something, the chances are they would obey without hesitation, never thinking of anything but the fact that their boss had ordered it done.

Returning again to the matter of skilled labor, there is an under supply of really skilled laborers in the islands. Practically all the efficient workmen have been developed by the companies previously noted, but there is in addition a large element of half trained men who masquerade as skilled labor and pull down the average of quality. However, enough has been accomplished to show that the native possesses qualities which, properly cultivated, will serve to develop a skilled working class. One trouble with the Filipino is to induce him really to learn a trade thoroughly from A to Z. He frequently makes a start, and after six months throws up his apprenticeship and strikes out to find a job as a full fledged skilled laborer, with the result that the shops are flooded with applications from laborers applying for work as machinists, etc., who can do little more than spoil good material.

A great deal of the educational work thus far done has unfortunately inculcated in the native mind an idea that it is lowering to labor and soil the hands. The result is that a great many youths are being brought up in the public schools who cannot be induced to take up and learn any useful trade, but prefer to seek employment as clerks, office boys, servants and the like. The towns and cities are quite overrun with this class already, and the applications for minor clerkships is so much in excess of the demand that standard wages are but $7.00 per month for that class of work, while the machine shops, boiler shops, fitters shops and similar engineering establishments are searching the islands for artisans and offering oftentimes as much as $20.00 a week for men who understand some useful trade. Contractors are sometimes compelled as a last resort to import men from Japan to earn these good wages and to do the work which the Filipinos should be doing for themselves.

Throughout the Oriental countries generally the superiority of the carpenter in the skilled labor class is marked and the rule has held good in the Philippines, certainly until very recently. The untutored Filipino carpenter knows but one tool, the bolo. It is simply a knife with a blade about 15 inches long, three inches wide and one-eighth of an inch thick, single edged. It serves as a plane, hatchet, chisel and hammer, and with it the native carpenter, left to himself, will build an entire house, not of the native variety merely, but in accordance with the design characteristic of foreign houses in the Philippines, which are frequently quite elaborate in construction and finish.

The Filipino carpenter has been compelled to adopt the nail first among modern auxiliaries of the trade, and, unless otherwise provided, the blunt back of his bolo, one-eighth of an inch wide, is made to serve as a hammer face with much better success than would be supposed. In his original cult the nail plays no part and all attachments between members of a structure are made with bamboo strips or rattan. Nearly all the native houses, and many foreign, are even now built in this way, and apparently the only serious defect as compared with nailing is the time consumed in the construction. The native carpenter has much difficulty in mastering the operation of foreign tools at first, and it is necessary always to guard against a return to his beloved "bolo."

It is rarely more difficult, and is generally less so, to teach an absolute novice, if he be of the same natural intelligence, the use of modern tools of carpentry, than an artisan wedded to the use of the bolo. This probably accounts for the rapidity with which other craftsmen, such as machinists, masons, etc., have overcome the early lead of the carpenters. They were unhandicapped by predilection of any binding sort, unless we except earth and rock excavation. The native method of rock excavation is to build a fire to heat the rock. Then cold water is thrown on and the cracked stone removed, when the process is repeated. This process, as it does not imply practice in the use of a certain tool, is readily discarded by the native for the drilling and blasting method. They quickly learn the use of mining hammer and bar drill and the best of the natives will get out as much as the average white workman. On earth excavation there is reticence about adopting one of the white man's tools, his shovel, chiefly because of injurious effect on the soles of bare brown feet.

As a machinist the native shows decided aptitude, but fails in steadiness as a general rule. Otherwise he displays, as do also the carpenter and the mason, the deep rooted fault of wastefulness of materials. So great is this fault now, that the saving to the employer in cheap wages as compared those paid to white workmen is oftentimes swallowed up in waste of materials. This is but another manifestation of immaturity which may perhaps be rectified wholly or in large part by suitable manual training at an early age.

With regard to relative efficiency of white and native labor in the skilled trades in the Islands, my experience has been that a Filipino does about one-half as much work in a day as a white man in that country, and about one-third as much as a white man does in his own country, with the advantage on the side of the white man that he thinks farther ahead of his job than a native and is not so wasteful of materials. An outline of the scale of wages for various classes of labor may be interesting.

Farm hands earn about 20c. a day on the average. This same element employed on public works is paid from 30c. to 40c. a day. Rock men and semi-skilled workmen receive 40c. to 50c. per day. Of the really skilled artisans carpenters are the most plentiful and they receive from 60c. to $1.50 per day. Blacksmiths are paid from $1.00 to $2.00 per day, boilermakers $2.00 and more, and machinists from $1.50 to $2.50. Steam engine drivers and plant operatives are paid on a monthly basis of from $30.00 to $75.00 per month.

The only marked defect applying to all classes of workmen is that of instability. The Filipino is not steady and may not be depended upon as a regular laborer until he makes up his mind to feign sickness less frequently and until he manages to reduce materially the hypothetical death rate recorded among his relatives. Instances are known where single workmen have lost dozens of imaginary aunts and uncles and several such fathers and mothers in the course of a single year.

The application of the Chinese exclusion act in the Philippines is a policy of questionable merit. A little competitive stimulus would probably be of great benefit to Filipino labor. Competition in labor is just as necessary to development as competition in trade. The Chinese in the Philippines now do not compete with the natives as regards the price of labor, but only as to quality. Close observation would seem to indicate that Chinese might be admitted in limited number and under certain restrictions simply to supply the example to a people less advanced in the conception of the value of consistent work. Chinese could lead the way into undeveloped regions where the Filipinos are loath to go on account of antipathy to immigration. This does not apply strictly to Luzon, and bears very little on the situation in the Visayan Islands where the new railroads are to be built. It does, however, apply to Mindanao and her unmeasured and apparently immeasurable resources. Settlers capable of aiding actively in the physical work of developing the Islands can come only from China. Americans and Europeans are debarred from severe physical work by the climate, while the Japanese have never made a success in the tropics, and are in reality about as little likely to settle extensively in the Philippine Islands as ourselves.

It resolves itself into a question of accelerating progress in the Islands, not of insuring their future. That has been insured by the active measures being taken otherwise in the way of railroad development, etc. However, the success of the present railroads is in turn assured by the well populated and rich country they will traverse. It is to the less densely peopled, but none the less rich areas in the archipelago that the Chinese labor question applies with particular emphasis.

Case Hardening Wrought Iron.*

Wrought iron is nearly pure decarbonized iron, and is not possessed of the property of hardening. Articles made from wrought iron may be externally converted into steel without depriving the interior of its natural character or structure. The process is called "case hardening."

The object of case hardening is to obtain an external steel encasement with a core of fibrous iron in the center. The effect is produced by a perfectly air tight box and animal carbonizing ingredient. The box should be of plate or cast iron from ½ in. to 1 in. thick, the size and thickness of the box depending on the articles to be operated upon. The articles are put in the box in alternate layers with the carbonizing ingredients, commencing at the bottom of the box, say, with a layer of granulated bone of the thickness of 1 in., upon this a layer of the article is placed, then another layer of bone about ¾ in. in thickness, and so on until the box is nearly filled, finishing with a layer of bone on top of the articles, which should be 1 in. deep so as to well protect the first or top layer of articles and prevent blistering. The packing completed, the lid is put on and hermetically sealed or luted with loam or fire clay.

The box or boxes are now placed in a suitable furnace. The furnace should give a uniform heat of about 1,350 deg. F. Over-

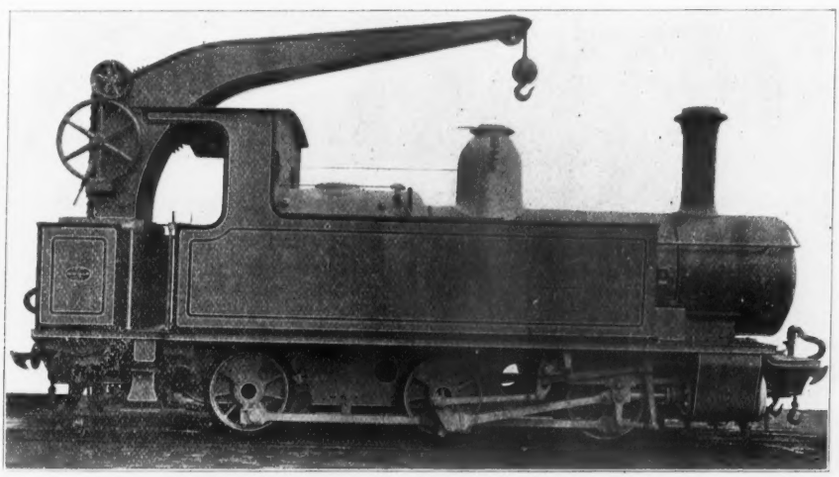
*A paper read before the annual convention of the Railway Master Blacksmiths' Association, by George F. Hinkens.

heating is injurious, and will crystallize or make the articles brittle.

In heating wrought iron or case hardening there are several considerations, the principal one being heat and duration of time for carbonization, same being governed by the size or bulk of the work to be case hardened.

Heating: In point of importance it stands first, for if the primary cause of bad case hardening could be traced, its origin in a majority of cases would be found in bad heating. There is no operation connected with case hardening which requires more watchfulness and gives more anxiety than proper heating. It may therefore repay us to examine with ease the conditions to be observed in obtaining results. As to heat, we must have a thorough admission, uniform and exacting to a degree; the heat must be constant and uniform and should not exceed 1,350 deg., for the degree of heat will have a bearing on the fibrous structure of the material. A high and excessive heat will render the material brittle, and if the article is light in structure it is apt to break easily in service; therefore, it behooves us not to overheat or unevenly heat articles to be case hardened. Consequently keep the furnace at a regular or constant temperature, for if the articles to be case hardened are overheated the damage is done so far as a fibrous structure is concerned; the article is hard, but the interior is brittle and crystalline when it should be fibrous and showing a dark or black appearance of its natural structure with a fine grained surface analogous to tool steel.

Where I am employed we do a great deal of case hardening all of which is done under my supervision and direction. We case harden as high as five tons of wrought material in 24 hours, same requiring 10 furnaces. We are exceedingly particular about the heat treatment, as much so as we are in the heat treatment of tool steel when tempering.



Crane Locomotive, Built by the Vulcan Foundry, Lancashire.

Some years ago I was employed where the general foreman had charge of case hardening. Of course a general foreman has, and should have, that right or privilege. However, this particular individual thought he was the "only" in that particular branch—case hardening was his "long suit." He arrived at his conclusion from the great depth or case or shell of hardness and the quickness of time in which he accomplished the result, never taking into account the preservation of the natural and proper structure of the material. Well, he got a very deep shell or case, and very hard, but the articles were more akin to pig than wrought iron, due to an excessively high heat. They case hardened crank shafts in this manner: The crank pins were of the solid rod type with a projecting thread end. Their method of putting crank in the driving wheels was by placing a sleeve over the threaded end of the pin, sleeve butting against the shoulder or crank pin. A battering ram was then brought into service, striking the sleeve. Of course this method produced a great shock at the weak point of the pin, which was at the small, or nut end. Often the end in question would drop off while driving in the pin. Upon examination I found the structure of the material as friable and brash as cast iron. The amazing part of it was that the general foreman blamed the material, and of course the material was bad, but not until this particular genius put the finishing touch on it by his peculiarly wrong method of case hardening.

The furnace is an important factor. An oil or gas furnace to work successfully should be so constructed as to secure proper mixture of gases, a thorough and even combustion in every part of the furnace. The furnace should be constructed with roof arched throughout its entire length in order that the heat may be reflected directly and uniformly upon the boxes. The passage to the chimney is formed underneath the hearth, causing a down draft, the action being to throw the heat down upon the boxes. There are six flues, separated from each other at the end farthest from the fireplace. These flues run parallel toward the fireplace or combustion chamber, where they are connected downward with the main flue underground, thence into the chimney.

It will be seen that this arrangement of furnace insures as near as possible an even heat throughout every square inch of heating parts of furnace. The furnace thus described can be heated with either oil or gas and has a capacity of 8 boxes 12 in. wide, 20 in. long and 8 in. high. The size of the box is, of course, governed by the size of the articles to be case hardened.

A quick method for case hardening consists of heating the material to be hardened to a red heat and submerging in a bath of molten cyanide of potash, leaving it from one to five hours, according to bulk of material to be hardened. Cyanide of potassium gives off poisonous fumes, consequently the vessel containing the cyanide of potassium should be placed in a furnace with a draft. This method is dangerous for the operators and should, if used at all, be used in a very careful manner.

Crane Locomotive.

The Vulcan Foundry Company, Limited, of Newton-le-Willows, in Lancashire, England, build a locomotive crane that is of a somewhat different design from those in common use in the United States, where these machines are merely traveling cranes intended for use in and about yards and are not expected to do any hauling. The Vulcan machine, on the other hand, is a complete switching engine fitted with a swinging crane at the rear that is capable of lifting and slewing by steam a weight of three tons at a radius of 14 feet. In addition to this it can be used for regular switching service for light work. It is, therefore, especially well fitted for service about industrial works where there is an inter-shop system of narrow gage tracks, the gage of the engine shown being 3 ft. 6 in. The weight and capacity of the machine is, however, pretty well up and would have been considered very heavy not so very many years ago. The cylinders have a diameter of 14 in. with a piston stroke of 20 in., and a total weight in working order of 84,500 lbs.

The Walschaert valve gear is used, so that all of the machinery is readily accessible outside the frames and the small driving wheels occasion no inconvenience.

The crane post is footed in a heavy base, bolted between the frames at the back, and is stayed by a strong bearing on a line with the top of the coal bunker.

The other principal dimensions of the machine, in addition to those already given, are:

Diameter of wheels	36 in.
Wheelbase	12 ft.
Heating surface, tubes	675.5 sq. ft.
" " firebox	77.5 "
" " total	753.0 "
Grate area	12.8 "
Total height to top of stack	11 ft. 6 in.
Tank capacity, water	600 gals.
Tank capacity, coal	67 cu. ft., or about 1½ tons

Unit Costs of Railroad Building.

I.

The first paper of this series, to which further reference is made in the editorial columns, deals with eastern railroads of a first class character, with steel spans, concrete abutments and piers, 80-lb. rail, stone or gravel ballast, and solid and permanent construction throughout.

(A) UPPER HEADWATERS OF A LARGE RIVER IN PENNSYLVANIA.

(1) Length of new railroad, 9.06 miles main *single* track, 5.45 miles sidings.

(2) Year built, 1902.

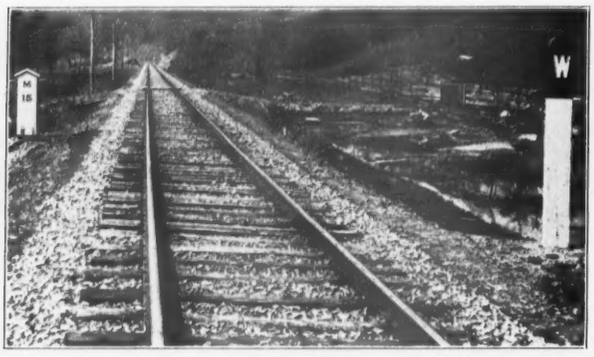
(3) Cost for a distance of 9.06 miles, including preliminary surveys, clearing right of-way, roadbed, ties, rails, ballast and sidetracks, in shape for operation but not including real estate, stations, equipment or signals, $26,300 per mile.

(4) Brief description of physical characteristics of country traversed: The line follows the course of a large river in western Pennsylvania, with considerable side hill cut and fill, with cast-iron pipe and concrete arch culverts, with no tunnels and very few bridges. Excavated material largely loose rock and

earth. Sidings amount to 60 per cent. of main track mileage.

(B) HEADWATERS OF A LARGE RIVER IN PENNSYLVANIA BELOW LINE "A."

(1) Length of new railroad, 15.77 miles main *single* track, 3.61 miles sidings.



Line A.

Line B.

Line A.

Line B.

(2) Year built, 1903.

(3) Cost for a distance of 15.77 miles, including the items above mentioned in "A," $37,014 per mile.

(4) Brief description: This line lies in the valley of one of the large rivers in western Pennsylvania, below line "A" as above described, the character of the side hill construction being quite heavy, material consisting of earth and loose rock, with three crossings of the river, only one of which, however, is of an expensive nature. Sidings amount to 23 per cent. of main track mileage.

(C) MIDWATERS OF A LARGE RIVER IN PENNSYLVANIA.

(1) Length of new railroad, 30.08 miles main *single* track, 6.64 miles sidings.

(2) Year built, 1901.

(3) Cost, including the items above mentioned, $60,628 per mile.

(4) Brief description: This line parallels the same large river in western Pennsylvania as lines "A" and "B," along the midwaters thereof below line B, where the side slopes are very steep, with sinuous alinement, three crossings of the river which in this section is 300 to 500 ft. in width, and four piercings of mountains with tunnels aggregating 1.33 miles in length. Sidings amount to approximately 22 per cent. of the main track mileage.

(D) DETOUR AROUND LARGE CITY IN EASTERN NEW YORK.

(1) Length of new railroad, 3.6 miles main *double track;* no sidings.

(2) Year built, 1903.

(3) Cost complete, including the items above mentioned, for a distance of 3.6 miles, $76,336 per mile.

(4) Brief description: This line consists of a double-track, low grade connection between the two main lines of the company, and involves heavy work at the crossings of the main four tracks of the New York Central, overhead and underneath crossings of several highways, and the crossings of two deep ravines. Permanent construction was used throughout; nature of material, sand and gravel.

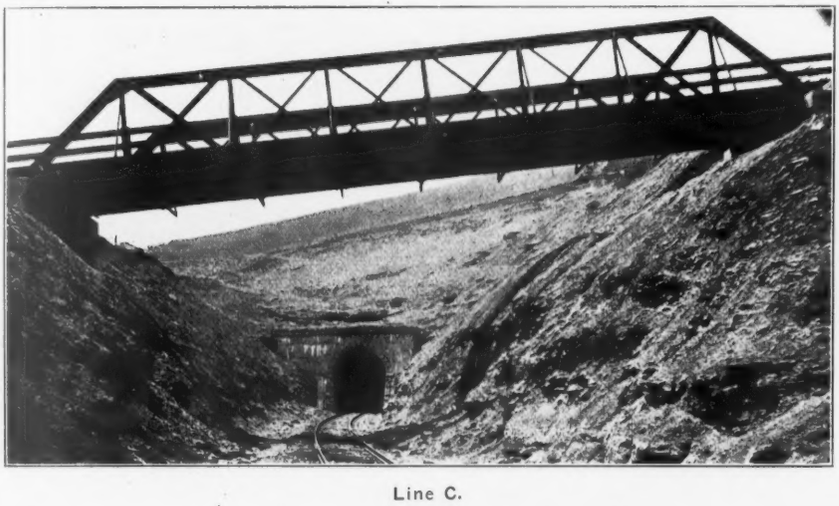
(E) CONNECTION BETWEEN TWO MAIN LINES IN EASTERN NEW YORK.

(1) Length of new railroad, 1.57 miles main *double* track; no sidings.

(2) Year built, 1899.

(3) Cost, including the items above named, $105,186 per mile.

(4) Brief description: This line consists of a low-grade double-track connection between two main lines, involves crossings of the four-track main line of the New York Central, Mohawk River, Erie Canal



Line C.

Line C.

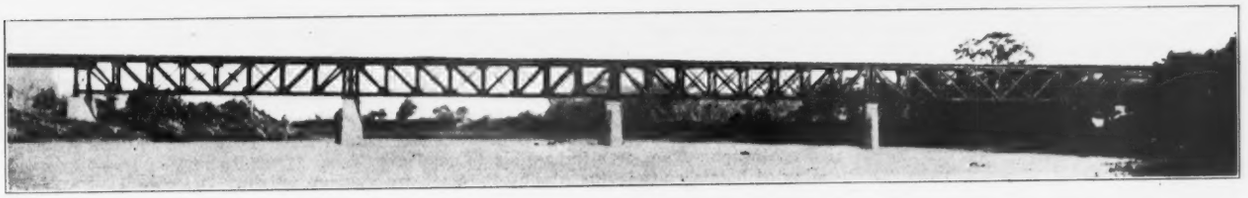
Line C.

Line D.

Line D.

Line C.

Line F.



Line E.

and a highway, all of which required heavy embankments, extensive bridging and a change in the grade of the New York Central.

(F) DETOUR AROUND LARGE CITY IN WESTERN NEW YORK.

(1) Length of new railroad, 11 miles main *double* track; no sidings.
(2) Year built, 1898.
(3) Cost complete, including above named items, $50,000 per mile.
(4) Brief description: This double-track line crosses under five

Line F.

trunk line railroads at the northerly end and over four trunk line railroads at the southerly end, necessitating heavy cuts and heavy fills, long hauls of material and extensive bridging at crossings of railroads and three intersecting streams.

American Railroads—A German View.

In 1904 Mr. W. Hoff and Mr. F. Schwabach, two railroad men of high standing in the Prussian railroad council, traveled over part of the United States and spent several months in studying American railroads. The result of their studies was published a few months ago in a volume of 378 pages. The shortness of their stay allowed some incorrect statements to creep in, but in reading the book as a whole one is impressed by the honest desire of the authors to be fair and just and to estimate circumstances new and strange to them, as well as they could.

Particularly interesting to American railroad men are two chapters, of the twelve forming the book, containing remarks of a more general character, and we think it is worth while to translate them as completely as space permits rather than to give a more detailed review of the book in general. In so doing, we have picked out especially strong criticisms of American methods and comparisons with German ways, because of their interest to American readers, but it should be understood that the book is not written in an unkind spirit, and that the authors are generous in giving credit, when they believe credit to be due.

The itinerary of the visitors covered a round trip from New York to Boston, Buffalo, Niagara, Albany and New York, and a more extended one to Pittsburg, Chicago, St. Paul and Minneapolis, Yellowstone Park, Northern Pacific, Portland, Oregon; San Francisco, Southern and Union Pacific, Denver, Lincoln, Neb.; Kansas City, St. Louis, Pittsburg, Cleveland, Washington, Baltimore, Philadelphia, New York—about 9,669 miles.

The first chapter is devoted to a general outline of both round trips. The second chapter contains the following comment of a general nature.

A phenomenon of American practice, more pronounced than in any other country, is uniformity, based upon a characteristic trait of the American people, the endeavor to repeat successful experiments. It cannot be denied that carrying out this idea the Americans owe part of their success in different fields, especially in the industrial field, to the German mind. This necessitates the loss of individuality, which does not suit us.

So far as we could observe, the towns—and in absence of purely local settlements, all villages will in due time become towns—in their exterior upbuilding generally have followed the system of streets, intersecting avenues at right angles. The reason for this lies in the fact that, differing from Europe, where historical development, war troubles, etc., have forced location and layout of streets upon towns, the American towns, being modern creations, could develop as they pleased. Their layout alongside of lakes and rivers—which is much more common than in the old world—was solely determined by the fitness of the selected location for commerce and industry. This had one disagreeable consequence; factories and works of all kinds are undoubtedly more numerous in the interior of cities than they are in Germany. The streets are mostly given numbers, instead of names, as with us, and are therefore more easily found. The buildings, especially the big ones, show a decided similarity, for example, the state capitols, with their uniform domes, shaped after the Capitol at Washington. The same trend of American taste dominates the building of hotels and their interior equipment; even the way of living is cut to a pattern, and to us Germans is the less welcome, as it robs us of the freedom of will and imagination, which we wish to have even in traveling. In spite of the variety of nations, which have contributed towards forming the American people, there exists a surprisingly uniform disinclination to walk through the streets. In American villages, which in Germany would be considered too small to keep up a street railway, because the German citizen would look upon spending 10 pfennigs for a short ride as extravagance, street railways are developed; even in small towns the service is managed the same way that it is in capital cities. On the other hand, it is surprising in a country in which inventive genius, especially in the technical field, has achieved such great things, to find other arrangements dating from a time when street railways were yet in their infancy. In railroad travel through America, wherever human settlements have penetrated one finds the endeavor to substitute for human muscles mechanical equipment. Even the smallest railroad stations have their trestles from which to dump freight (especially coal) from the cars, of which a great number are fitted with doors in the bottoms. Other ingenious landing arrangements are not wanting, and even insignificant quarries are fitted up with hydraulic or electric machinery. Whether this be always economical, we do not care to discuss. If in Germany we do not always pay enough attention to labor-saving devices, it is to be feared that American energy and enterprise does not remain entirely free from extravagance.

A man traveling in America, who is not primarily a railroad expert, is first of all pleased by the type of passenger cars. * * * For traveling up to medium distances this type of car certainly is not unfit; for traveling over longer distances it hardly answers just requirements. Sitting during long intervals with bent legs is uncomfortable. One is continually disturbed by people moving through the middle passage, even if all other passengers keep their seats. Our third class cars undoubtedly are better adapted to the customs of the German population than are the American chair cars. Relatively few persons in our cars are housed in one compartment; they have a toilet; there are special ladies' compartments, etc. That the ordinary American wagons cannot be compared to our second or first class is so obvious that further explanation is unnecessary.

Nevertheless, Americans generally are satisfied with their chair car, and if there is no pressure exercised by the public the railroads will certainly not voluntarily give up the present system, because it is undoubtedly advantageous to them in every way, especially in economy of space.

* * * That the German traveler is not satisfied with the Pullman cars arises from the manner in which the service is offered. It is not agreeable to us to be obliged to wash and dress together with several people, entirely strangers to us, after having waited perhaps half an hour before our turn comes, while we ourselves hurry involuntarily because of the others who are waiting. The American is not disturbed in the least by all this. We saw several men shaving at the same time quite oblivious of their surroundings. This explains, too, why the American does not see the deficiency in the relatively small number of washing arrangements. There is usually enough time, and so he waits till his turn comes.

* * * The way the window is put in the wall of a Pullman car leaves much to be desired. It is set so low that a person of even medium height cannot look out of the window. One sees the bulge containing the upper berth, and a traveler not used to American arrangements is sure to hit his head against that bulging part in trying to look out of the window. It is also difficult to open the window during the daytime, because it must be raised instead of lowered.

* * * So far as we could observe, the servants in the Pullman cars—conductors excepted—are all negroes. The service generally is good, if one is able to overlook the ill smell peculiar to negroes, and the fact that the black servant is apt suddenly to take his place alongside of a traveler and try to start a conversation. He feels himself a gentleman, if he happens not to be busy. Surely the service is ample, there being at least two servants to a car.

Lighting of the trains seems not to be up to the full standard of excellence, except in the very latest Pullman trains de luxe. In those trains it corresponds about to the equipment which has for some time been provided in Germany in a number of fast trains, consisting in an electric light over the head of each traveler. A considerable number of otherwise very good trains are even today equipped with oil lamps, so that it is impossible to read in the evening. Lighting in ordinary cars we found very poor. From Buffalo to New York we rode in a car on a fast train in which it was impossible to read even large type. Luxury of travel is manifestly absent in most trains run without Pullman equipment in non-competitive service, except in short suburban runs. Where there is competition, however, every effort is made to provide comfort.

We were disposed to think that in the absence of it the railroad was willing to economize in the equipment furnished, to further the use of Pullman cars. Such trains are often defective in cleanliness, water supply, etc.

As regards sleeping cars, the American berths are better than ours, and are considerably broader, so that it is possible even for two persons to find room in the same berth. The arrangement of berths in the direction of the train is also an advantage in the American cars, since the traveler is less shaken about than in our cars, where the berths are set across the car. In consideration also of the very heavy passenger coaches, the tight coupling, alternate rail joints, and the greater number of ties—all of which things favor quiet riding—the highest degree of perfection would be reached in America if other details did not partly counterbalance these good points. Among the disadvantages may be mentioned first of all the use of the whistle and the constant ringing of bells. This by itself is exceedingly disturbing, especially at night. The passenger hears not only the whistle and bell of his own locomotive, but also those of others entering the station at the same time.

The station buildings, according to our observations, frequently failed to comply with traffic requirements. This may be partly attributed to the rapid growth of the towns and cities, with which traffic facilities have not been able to keep pace. Where there is competition, again, especially at large points, the station accommodations are generally equal to those in Germany; but on the average the American, so very particular about his home, is satisfied with the most simple stations, bare of every luxury, except in regard to sanitary arrangements. It is noteworthy, also, that the barber shop, which to such a remarkable degree forms a life necessity to the American, is seldom missing, and there is also quite universally a bootblack stand. The ticket booths are usually placed in the general waiting room, and it was only rarely that we found a booth where it was not necessary to use artificial light during the daytime. Even in the smaller stations we were especially struck by the presence of the so-called quick lunch rooms, which, in accordance with American habits, are extensively found throughout the country. In general, it is not in accordance with our notions of comfortable living to imitate the American haste in eating but it cannot be denied that when a railroad connection leaves only a few minutes for refreshment, quick lunch rooms would be decidedly useful in Germany, especially at tourist stations, with heavy traffic and short stops.

Punctuality seems to be a sore spot with American railroad traffic. In that respect American railroads stand without doubt considerably behind the German roads. It cannot be said, off hand, to what extent American traffic arrangements are at fault. In America, as well as in Germany, travel develops in lines not always expected, and it is not easy to provide for all emergencies as liberally as might be desired.

As regards time tables, we noticed two principal differences from our practice—the way the time table was worked out and the way local train despatching is arranged. With us, the graphic time table, which gives to each passenger and freight train its definite location and time, is so made that train despatching—extraordinary cases excepted—regulates itself smoothly by the time table and can be managed independently from each station as a radius. In the German time table from the start a sufficient number of extra passenger and freight trains are provided so that in case of emergency it is only necessary to decide whether an extra train shall be run or not; its time table is already in existence. It is obvious that this system involves considerable extra work in making the time table, but it is also obvious, in view of the necessity of smooth running of trains, without interruption and with public safety, that some such device is quite indispensable; yet such a time table, regulating like clockwork the smallest detail of the train movement and providing for all sorts of contingencies, is unknown on most American railroads. Of course, American time tables fix the running of passenger trains as exactly as possible, and the times of arrival and departure of freight trains are also set; but we found nowhere time tables as precise as the ones in use in Germany. The order of the train despatcher everywhere seems to govern train movement more than the fixed, unchangeable time table, and the train despatcher is in charge of traffic movement, notwithstanding the fact that with successful introduction of mechanical signaling, etc., the stations in America would be quite as well adapted to take the responsibility for train movement as are our German stations. Where signaling apparatus has been locally concentrated and the safety of train traffic has been secured by mechanical devices, the service is similar to ours, but even in such cases the train despatcher is in evidence, while with railroads which run few trains, especially in the West, he reigns supreme. It also struck us as strange that so little was made of graphic time tables. The graphic form seems only to be used in making the original time table in the superintendent's office, and is not to be found in the hands of a single employee along the road. Service time tables are generally not constructed for a whole railroad system, but only for a single division, so that every irregularity reaching beyond the limit of the division calls for an explanation between the two divisions affected. With increasing traffic the extent of the division becomes less, sometimes not more than thirty miles, and the arrangement often works slowly, especially because the method of reporting is much more extensive and complicated than in Germany.

Equally different from our method is the management of outer station service. The controlling action of the despatcher makes it impossible that the station master should have the authority of our station superintendents, consequently upon arrival stopping, or departure of a train at an American station, there seems to be no one who has the train in hand. That is to say, there is no single employee who has full charge of this part of the service. Yet American experts see in our service superintendent only a species of policeman, who leads the public in strings and for whom there is no room with the American public. The entire management of traffic at stations, in connection with the carelessness of the public, undoubtedly offers one of the causes to which the unproportionately large number of accidents on American railroads can be attributed.

Fifty-Year Old Creosoted Timber.

Half a century ago the docks at Wisbech, Cambridge, England, were piled and sheeted with Pinus sylvestris—otherwise known as memel fir, baltic fir, or Scotch pine. The creosote, as the photograph of a specimen shows, was not driven deeply in the wood; indeed, it is probable that this kind, well seasoned, was simply dipped in a tank of creosote and allowed to soak for about one day. The specimen shown is a section sawed from a capsill, so that during this long period of use it was exposed to the air and all the changing conditions of moisture and temperature. The wood is still absolutely sound. The wide check opened out in the thin section after the specimen was sawed for Mr. Von Schrenk, and it should not therefore be taken into account.

Creosoted Pile Section after 50 Years' Service.

Regularly Assigned vs. Pooled Engines.

The following note is taken from a report presented before the Traveling Engineers' Association by the committee on this subject, Messrs. C. F. Richardson, chairman; H. L. Bartels, F. B. Childs, W. J. Stuart and P. H. Stack:

It has been the privilege of the chairman of your committee to have had a somewhat varied experience with both pooled and regularly assigned engines. In each case when the pooling was resorted to the power was in good condition and the crews were interested in their engine, so if a nut came loose, a wedge came down, or a brass needed keying, you would find the engineer giving these parts his personal attention, and you would find him at the roundhouse looking after work reported to be done to see that it was done, and in many cases engineers would themselves make like repairs. After the engines were pooled these same men became discouraged and those who could afford it would lay off rather than run the engines after they had been in the pool several months, owing to their bad condition.

When they were first pooled there was a marked increase in the mileage of the chain-gang engines, but this was of short duration. After they had become somewhat worn and flues began to get weak and needed good handling, much difficulty was experienced as the men had become indifferent about their work, and the average mileage became less than that of the regular engine. From my observation of different roads, I believe engines can in most cases be regularly assigned. A greater part of the year the crew will be able to follow the engine. There may be short periods when this could not be done, but with an ample extra board to draw from, these conditions could be taken care of. A freight engine with a regular crew will have more trips credited to her where she has handled full tonnage over the division, or if in

passenger service she has made up time and arrived oftener at the terminal on time than if she had been handled by all the different crews. An engine handled for seventy-five per cent. of the time by regular men, means the interest and co-operation of those men, which must naturally result in the benefit of the service. If we take into consideration the delays that occur which could be eliminated by having regular crews, the money paid for overtime due to these delays would go a long way toward paying the interest on the cost of a few more locomotives. You might add to this a good big percentage for repairs due to the indifferent manner in which the machine is handled without a regular crew.

If you examine the reports made to the Interstate Commerce

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What's What in Russia.

Commission by the different trunk lines showing the amount of money expended to keep each locomotive in repair for the year ending June 30, 1905, you will find two of the large trunk lines where they keep regular crews on their engines making the best showing of all railroads in the United States, and these two roads have a reputation second to none in point of good service.

Supplies for the Grand Trunk Pacific.

The Transcontinental Railway Commission has let the following contracts for material: Dominion Iron & Steel Co., 33,000 tons rails, $1,127,000; Nova Scotia Steel & Coal Co., 1,217 tons splice bars, $57,247; Gananoque Bolt Co., 310,000 lbs. track bolts and nuts, $10,635; Toronto Bolt & Forging Co., 208,800 lbs. track bolts and nuts, $7,300; Peck Rolling Mills Co., 1,188,200 lbs. track spikes, $29,705; Hamilton Steel & Iron Co., 729,000 lbs. track spikes, $18,589; Toronto Bolt & Forging Co., 728,900 lbs. spikes, $18,586; Montreal Rolling Mills Co., 728,910 lbs. track spikes, $18,536.

A Popular Phase of Government Ownership.

There are reproduced herewith two pages from the official Russian railroad guide. At first glance at the left-hand table the reader might be justified in feeling that there is, indeed, a great gulf fixed between the east and the west. But a closer study reveals a bond of sympathy which is felt all the more strongly when it is observed that in choosing the naïve symbols representing peace and refreshment to the weary traveler the Imperial Government has selected a typically American ante-prandial rejuvenator. The *entente cordiale* being now established, it appears on further exam-

Приплаты въ пп. 1 и 2 см. 411, 419, и 420.

90. Москва - Брестъ (до Смоленска) и обратно.

пересадки { Москва—Варшава I—II кл. въ пп. 1 и 2, I—III кл. въ пп. 3, 4, 5
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12 30	—		—	Отъ **С.Петербургъ**	100	Пр	604		—	6.40	8. 0
8 0	—		604	Пр **Москва** Ник..		Отъ	—		9. 0	11. 0	4. 0

Ск. 5 I—III	Пч.3 I—III	Тп. 7 I—III		Верс.	Московско-Брестская жд.		Верс.	Тп. 8 I—III	Пч.4 I—III	Ск. 6 I—III
9 0	9 40	11 0		—	Отъ **Москва** М.-Бр.	Пр	1025	7.30	9.30	10 30
—	—	—		—	Фили		—	—	—	—
—	10 0	—		—	Кунцево		—	7. 5	9.11	10 11
—	10 11	—		—	Нѣмчиновскій постъ		—	6.51	9. 0	10 1
—	10 21	—		—	Платформа 20 вер.		—	6.38	—	9 53
9 44	10 27	11 54		23	Одинцово		1003	6.32	8.47	9 48
—	10 36	—		—	Юдинская (пл.)		—	6.13	8.35	9 38
—	10 46	—		—	Платформа 34 вер.		—	5 59	8.25	9 28
10 15	11 2	12 37		41	Голицыно		984	5 42	8.11	9 14
—	11 14	—		—	Сушкинская пл.		—	5 28	—	9 3
10 45	11 33	1 14		60	Пр. **Кубинка**	Отъ	966	4 59	7.37	8 43
10 53	11 41	1 24			Отъ.	Пр.		4 49	7.27	8 35
11 17	12 3	1 54		—	Мухино		—	4 21	7. 5	8 14
11 32	12 21	2 16		81	Шелковка		945	4 3	6.51	8 1
11 50	12 39	2 38		—	Шаликово		—	3 34	6.26	7 40
12 0	12 57	3 3		103	Пр. **Можайскъ**	Отъ	922	3 10	6. 7	7 21
12 16	1 7	3 23			Отъ.	Пр.		2 45	5 55	7 13
12 36	1 27	3 47		114	Бородино		912	2 24	5 38	6 56
12 50	1 41	4 4		—	Колочь		—	2 3	5 20	6 40
1 9	2 1	4 36		130	Уваровка		896	1 45	5 5	6 25
—	2 24	5 6		—	Сычики		—	1 5	4 38	—
1 45	2 40	5 27		150	Ватюшково		876	12 59	4 28	5 51
—	2 56	5 47		—	Колесники		—	12 23	4 4	—
2 14	3 10	6. 5		169	Пр. **Гжатскъ**	Отъ	857	12 1	3 44	5 10
2 24	3 20	6.20			Отъ.	Пр.		11 46	3 32	5 0
—	3 35	6.39		—	Красицкая		—	11 28	3 19	—
2 54	3 52	7. 1		186	Серго-Ивановская		840	11 10	3 5	4 34
3 13	4 11	7.28		—	Туманово		—	10 44	2 47	4 18
3 37	4 37	8. 6		210	Мещерскъ		816	10 13	2 24	3 55
—	4 53	8.25		—	Комягино		—	9 51	2 5	—
4 7	5 8	8.44		228	Пп. **Вязьма** М.-Бр.	Отъ	798	9 30	1 50	3 24
—	6.30	—		—	Отъ **Вязьма** Ник..	104 Пр	244	7 0	12 10	—
—	4.25	—		244	Пр **Лихославль**	Отъ	—	9.40	3.15	—
—	—	12.30		—	Отъ **Вязьма** М.-Бр.	107 Пр	279	4. 0	11 40	2 47
—	—	11 10		279	Пр **Тула**	Отъ	—	5 16	9. 0	5.10
4 22	5 28	9.29		228	Отъ **Вязьма** М.-Бр.	Пр	798	9 0	1 20	3 4
4 44	5 50	10. 0		—	Гредякино		—	8 38	1 4	2 47
5 1	6. 9	10.26		249	Сапѣгино		776	8 10	12 45	2 29
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6 22	7.34	12.21			Отъ.	Пр.		6 11	11 17	1 1
6 30	7.44	12.36						5.50	11 7	12 51
6 56	8.10	1. 9		—	Вышегоръ		—	5.22	10 36	12 30
7 9	8.25	1.32		318	Михайловская		708	5. 4	10 31	12 18
7 22	8.38	1.49		—	Милахово		—	4.39	10 15	—
7 43	9. 2	2.22		334	**Ярцево**		692	4.17	9 58	11 44
8 11	9.30	2.58		—	Присельская		—	3.36	9 27	11 15
8 33	9.54	3.33		361	Каменка		665	3. 1	9 1	10 50
—	10. 6	3.51		—	Пересвѣтово		—	2.40	8 47	—
8 59	10.23	4.16		376	Духовская		649	2.16	8 30	10 22
9 14	10.38	4.34		385	Колодня		—	1.56	8 15	10 9
9 28	10.52	4.53		392	Пр. **Смоленскъ**	Отъ	633	1.35	8 0	9 53

Through Dampest Russia.

ination that the time-table which we have taken the liberty of designating, "Through Dampest Russia," covers the line from Moscow to Smolensk. The letters "Врс" at the head of the familiar mileage column mean *versts*. A *verst* is two-thirds of a mile, and the road is therefore, according to our calculation, 16 drinks, or 260 miles long. At the favored city of Viazma (the hiatus about four inches from the top) the legal limit appears to be one on arrival and one on departure, but it seems as if an earnest man might pick up one or two more in the jungle of type in between. Incidentally, the insertion of arrows showing the direction of train movement, on time-tables arranged in this manner, is a simpler and more effective guidance to the average traveler than the notes "read up" and "read down" used in this country.

The second page shown herewith we are not quite sure of, but we opine that it is an index of stations and points near them with which connections are made. Here the artist's skill has been called upon to lure the prospective commuter or retired Cossack to secluded suburban retreats. The little boat means a ferry and the dainty, spirited pony takes the place of our disheartening "stage connection with Pierson's Corners."

GENERAL NEWS SECTION

NOTES.

The Buffalo & Susquehanna now sells a $20 ticket good for 1,000 miles, and good also on the New York Central, the Reading and the B., R. & P. The B. & S. will also reduce all local ticket rates to 3 cents a mile, and where the Pennsylvania is a competitor the rate, after October 1, will be 2½ cents a mile.

The Atchison, Topeka & Santa Fe has bought several hundred acres of land on the San Diego river, California, and is planning to plant on it a large number of trees to be grown for ties. Among the kinds to be planted are the sugar gum and the lemon-scented gum. The forester in charge of the work is Mr. F. S. Hosp.

L. Levi & Company, 111 Broadway, New York City, who have been leaders in a movement among the minority stockholders of the American Express Company to secure higher dividends on their shares, announce that the directors have acceded to their demands, and that the regular rate of dividend henceforth is to be 12 per cent.

The $20 mileage books announced by the Pennsylvania Railroad some weeks ago, which are good for 1,000 miles and are transferable, were put on sale September 1. These tickets are good on all trains, including limited trains (by payment of the extra fare) except the Pennsylvania Special (the New York-Chicago 18-hour train).

Study of the new Interstate Commerce law has led the railroads in Nashville, Tenn., to the conclusion that although it is lawful to make reductions to charitable institutions in passenger rates, it is not lawful to do anything of the kind with respect to freight rates, and therefore it has been decided that the United Charities of Nashville can no longer have carloads of coal brought from the Kentucky mines free, as has been done in past years. Coal operators in Kentucky have made gifts of coal to the Charities on condition that the railroads carried the coal free. The employees of the railroads also have heretofore been favored in the transportation rates on coal, but it is expected that this favor will now be cut off.

A press despatch from Buffalo says that the railroads of that city have agreed to increase from $1.50 to $2 the rate per car for switching bulk freight for connecting roads. From Chicago it is reported that the Chicago & North-Western and the Chicago, Milwaukee & St. Paul have given notice that they will no longer participate in the inter-line switching arrangement which has been long in vogue in that city. The several roads have regularly sent their switching engines with cars onto the lines of other roads with great freedom and to places many miles from home, and have thus delivered great numbers of cars to industries at considerable expense, without charge, the switching charge being absorbed in the freight bill. When it came to publishing the tariffs for this service, as required by the new law, the two roads decided that it would be a good time to put a stop to such a loose arrangement.

A press despatch from Montreal says that the Canadian Pacific is going to so arrange the trips of its steamships on the Pacific and on the Atlantic, with a special train to connect across the continent, that passengers and mails can be carried between Liverpool and Hong Kong in 30 days, which is claimed to be five days better than the best time between England and China by way of the Suez Canal and the Peninsular & Oriental steamers. The distance between Liverpool and Hong Kong across Canada is given as 12,004 miles. The estimated time is, in days:

Liverpool to Quebec	7
Quebec to Vancouver	4
Vancouver to Hong Kong	19

And the mileage is:

Liverpool to Quebec	2,661
Quebec to Vancouver	3,072
Vancouver to Yokohama	4,283
Yokohama to Shanghai	1,178
Shanghai to Hong Kong	810
Total	12,004

The first special train started from Quebec August 31, on the arrival of the Empress of Ireland from Liverpool, and the first eastbound special will start from Vancouver September 17, on the arrival there of the Empress of India.

Storage to Be Charged on Freight at Kansas City.

The Missouri Valley Car Service Association, with headquarters at Kansas City, Mo., has been reorganized and its name is changed to the Missouri Car Service & Storage Bureau; and storage is to be charged on less than carload freight, if the regulations are to be enforced as bravely as they are written, "as regularly and promptly" as demurrage on cars, or as transportation charges. Individual roads may refund demurrage or storage charges, after investigation by the manager of the bureau and a written recommendation from him, for (*a*) clerical overcharge or error; (*b*) failure of the railroad in movement of the freight; (*c*) unavoidable breakdown of consignee's appliances; (*d*) inclement weather in the free time, making it impossible to move the freight without injury thereto on account of the nature of such freight. This last provision, it will be seen, makes no provision for canceling a demurrage charge simply because a man does not wish to take his horses out in a stormy day. The free time appears to be 48 hours for all commodities. Heretofore grain and hay were allowed to be held 48 hours for inspection and reconsignment, and a period of three days was allowed for unloading coal, coke, lime and ore. The charge for storage of L. C. L. freight is 5 cents a ton for each day. The new rules of the association deal minutely with all conditions, and evidently have been prepared with much care, and as the result of intelligent study of the experience of the past.

New Ferryboats at 'Frisco.

Plans are being prepared by the Union Iron Works, San Francisco, for two new passenger boats for the Southern Pacific ferry between San Francisco and Oakland. The new boats are to be modeled after the "Berkeley," but will be constructed of steel, and with greater draught and more powerful engines than the "Berkeley."

New Ferryboats for New York.

Construction is to begin soon on three ferryboats for the city of New York to run from the Battery, Manhattan, to Thirty-ninth street, Brooklyn, the Department of Docks and Ferries having awarded the contract to the Harlan & Hollingsworth Company, of Wilmington, Del. The bid of this company was $635,000 for the three boats. There was only one other bidder, the Burlee Dry-Dock Company, which submitted an estimate of $249,000 for a single boat. The Harlan & Hollingsworth Company's figure for a single boat was $217,000. The Maryland Steel Company, which built the Staten Island boats for the city, did not bid owing to the labor clause in the contract. This clause provides that not more than eight hours a day shall be required of the workmen engaged, and that the prevailing rate of wages in the trade shall be paid. This stipulation was inserted in accordance with a recent decision of the Supreme Court.

The new boats are to be of steel, and will resemble the new boats of the Central Railroad of New Jersey. Their length will be 209 feet, and breadth 45 feet. They will have two two-cylinder compound engines, driving a shaft running from end to end with a screw propeller at each extremity.

Stolen Ties.

J. C. Betancue, the Southern Pacific detective, has been tie hunting for the company for several weeks, and has located some 5,000 Southern Pacific ties on ranches and at mines, some of them forty miles from the Southern Pacific right of way. He also found many Santa Fe ties west of Deming, where they had been carried by floods. An untreated tie costs the Southern Pacific on its New Mexico division, when put off the car, one dollar, and a treated tie costs a dollar and a quarter.—*Albuquerque Citizen.*

To Exhibit Safety Devices.

The American Institute of Social Service will hold an exhibition of devices for safeguarding lives and preventing accidents, at the American Museum of Natural History, New York City, commencing Jan. 28, 1907. This will be the first exhibit of its kind held in this country. Requests for information regarding space, etc., should be made to Dr. William H. Tolman, Director, 287 Fourth avenue, New York.

The Value of the Railroad Y. M. C. A.

Men should be cared for at terminals to improve their mental as well as social standing. We believe that good, clean rest rooms should be provided at terminals and encourage cleanliness with our men. We also believe that they should have access to reading rooms or libraries where they can keep themselves posted on the leading topics of the day, mechanical and otherwise. Your chairman is fortunate enough to be employed on a road that has a Railroad Y. M. C. A. at each terminal. At one of the associations there is a large library, and members of any of the other associations can draw books from this library, the books being handled back and forth by the railroad free of cost. At all of the associations there are good, clean rest rooms, and at several of the away-from-home terminals there are lunch rooms. We would heartily recommend the Railroad Y. M. C. A. to any railroad, as we know of nothing that will improve the standard of the men, from a moral or

social standpoint, more than these institutions.—*From a committee report to the Traveling Engineers' Association.*

The Traveling Engineers' Convention.

The Traveling Engineers' Association held its 14th annual convention at the Auditorium Hotel, Chicago, August 28 to 31, inclusive. Mayor Dunne, of Chicago, delivered the address of welcome, and A. E. Manchester, Superintendent of Motive Power of the Chicago, Milwaukee & St. Paul, also gave a short address. President A. L. Beardsley (A., T. & S. F.) was in the chair. In his address he touched on such important matters as superheating of steam, water treatment, Walschaert valve gear, mechanical stoking, and electricity for motive power, all of which were recommended to the attention of the members.

The subjects discussed by the convention were:

"Oil-Burning Locomotives," by J. B. Galivan (Santa Fe Coast Lines).
"Care of Locomotive Boilers." By F. P. Roesch.
"Regularly Assigned vs. Pooled Locomotives," Committee report.
"The Future Engineman," Committee report.
"Committee Work," by C. B. Conger.
"Walschaert Valve Gear," by O. H. Rehmeyer.
"Tonnage Rating," by F. W. Thomas.
"Handling Air Brakes in Passenger Service," By C. C. Farmer.
"Drafting Locomotives," by E. Hartenstein.
"Handling Locomotives at Terminals to Reduce Delays," Committee report.

Extracts from some of the foregoing papers will be found elsewhere in this issue, and others will be published from time to time. In addition to the regular papers and reports, Mr. H. P. Turner, of the Westinghouse Air Brake Company, delivered an illustrated lecture on the new E T brake equipment.

The officers for the ensuing year are: President, W. J. Hurley (N. Y. C. Lines); First Vice-President, A. M. Bickel (L. S. & M. S.); Second Vice-President, J. A. Talty (D., L. & W.); Third Vice-President, C. F. Richardson (Frisco); Secretary, W. O. Thompson (N. Y. C. Lines); Treasurer, C. B. Conger (Int. Corr. Schools). Chicago was selected as the place of meeting for 1907.

Government Railroad Inspector in the Philippines.

It is announced that the Philippine Commission, the body ruling the Philippine Islands, has created the office of Supervising Railway Expert, at a yearly salary of $24,000, Philippine currency. The function of the expert will be to see that contractors building railroads under the special concessions of 1905 carry out their contracts and conform to the laws; and, in general, to see that all railroad operations are properly carried on. The person to whom this "plum" will fall, says our informant, has not yet been named.

TRADE CATALOGUES.

Lackawanna & Wyoming Valley Railroad.—The Lackawanna & Wyoming Valley, an electric line connecting Scranton and Wilkesbarre, Pa., controlled by the Westinghouse interests, has issued an industrial pamphlet addressed to manufacturers. Under the title, "A Manufacturers' Paradise," the inducements offered by the road in favorable locations for industrial plants are taken up under the heads of power, shipping facilities, fuel, water supplies, and labor. A map is shown with industrial locations available along the road marked in a separate color. The pamphlet is illustrated with pictures of manufacturing plants already located, a coal breaker, the Scranton terminal freight house and power station, and one of the company's electric locomotives at the head of a train of freight cars. For an electric line to pursue the same methods of attracting industries as those which have been used by the industrial departments of the steam roads is an unusual occurrence.

Mine and Quarry.—The August number (No. 2) of this magazine of the Sullivan Machinery Co., Chicago, contains some interesting articles, the leading one being a detailed illustrated description of "The Gunnison Tunnel of the Uncompaghre Irrigation Project," especially written for this paper. Another interesting article is that on "Channeling in New York City," describing the work of this character being done in connection with the new terminal work of the New York Central. "Drilling in Coal Prospecting"; "Quarrying Sandstone at Amherst, Ohio," and "Excavation Methods of the New York State Barge Canal," are among the other articles which make up the issue.

The Oil Problem.—A two-page folder with this caption is sent by S. F. Bowser Co., Ft. Wayne, Ind., the problem being how to keep the oil in the storehouse, shop or factory clean and pure, prevent waste and evaporation and keep the surroundings clean. A solution by the Bowser system is offered in the folder. A bulletin (No. 51) of the same company describes and illustrates an elaborate installation made for H. Behlen & Bro., 31 Pearl street, New York.

Ideal Power.—The August number of the Chicago Pneumatic Tool Co.'s magazine includes articles on "Co-operation"—a reprint of Mr. Henry W. Thornton's address to the Traffic Club of Pittsburg—and the pressed steel passenger car of the Pressed Steel Car Co., exhibited at the Atlantic City conventions, in addition to appropriate articles reprinted from contemporaries, and notes and small items of interest in the field of this magazine.

Car Roofing.—A new catalogue of the Hutchins Car Roofing Co., Detroit, Mich., describes and illustrates the different styles of Hutchins metal and plastic car roofs. These include three styles of outside and two inside metal roofs, and two plastic roofs, one being sectional. Drawings showing details and dimensions accompany each style.

Specifications for Rails, Etc.—The little pamphlet of The American Bureau of Inspection and Tests, Chicago, contains specifications for new rails, both Bessemer and open-hearth, new splice bars, and first and second class relaying rails; also a blank for relaying-rail contract, and on the back cover tables for amounts of different track material per mile of track.

The Obermayer Bulletin.—The current number of this bi-monthly publication of The S. Obermayer Co., Cincinnati, Ohio, has as special articles, "The Right Way to Run a Foundry"; "Pig Iron"; "Ratio of Coke to Iron in Foundry Practice," and "How Mike Took Off His Heat."

Manufacturing and Business.

The Allis-Chalmers Co., Milwaukee, Wis., reports the sale of two 100-kw. generators to the Panama Railroad.

The Hicks Locomotive & Car Works have removed their general offices to the Fisher Building, Chicago.

A. L. Graburn, formerly Superintendent of the St. Cloud shops of the Great Northern, has been appointed to a position with Geo. M. Kenyon, railway materials, St. Paul, Minn.

Steven Bowling, of the railroad department of the Philip Carey Manufacturing Co., Cincinnati, O., has been appointed Manager of that department, with headquarters at Cincinnati.

The stockholders of the Southern Steel Company have voted to increase the capital $9,000,000, as follows: Preferred stock from six millions to ten; common stock from ten millions to fifteen.

Former Vice-President and Manager Chas. Partington, of the Weir Frog Co., Cincinnati, O., has resigned. W. W. Allen, formerly connected with the Ramapo Iron Works, Hilburn, N. Y., has been appointed manager.

W. J. Schlacks, heretofore Superintendent of Machinery of the Colorado Midland, has resigned to become Western Sales Agent for McCord & Co. at Chicago. Judson A. Lamon, General Sales Agent, McCord & Co., will move his headquarters from Chicago to New York about October 1.

The Kilburne & Clark Co., Seattle, Wash., has recently placed a large order with the Electric Cable Co., New York, for Voltax liquid compound to be used as a waterproof paint for the protection of railroad bridges which this company has in course of construction on the Pacific coast.

The following have been elected Directors of the Locomotive Appliance Company for the ensuing year: Frank W. Furry, J. J. McCarthy, J. B. Allfree, Willis C. Squire, Ira C. Hubbell, all of Chicago, Ill., and Clarence H. Howard, H. M. Pflager, B. F. Hobart, C. A. Thompson, W. J. McBride, all of St. Louis, Mo. and J. H. McConnell, Pittsburg, Pa.

The Carborundum Co., Niagara Falls, has started construction work on a large branch plant in Germany for the manufacture of carborundum. The buildings are to be entirely of concrete, fireproof construction, and the plant when completed will embody all of the latest and most improved machinery for the manufacture of abrasive materials. It is expected the new works will be in operation by January 1, 1907.

Iron and Steel.

The Southern has let an additional contract for 15,000 tons of rails for 1907.

The Boston & Maine is planning to lay during the present year about 30,000 tons of new rails. From 70 to 80 miles of the new steel will be put in on the Fitchburg line. The rails are all 85-lb.

Rail orders during August were lighter than for several months; during the last week of August the orders aggregated 33,500 tons. The last single contract reported was 15,000 tons additional for the Southern Railway for 1907.

The Chicago & North-Western has given an additional order to the Pennsylvania Steel Co. for 10,000 tons of standard sections for 1907 delivery, and the Missouri, Kansas & Texas for a supple-

mentary lot of 10,000 tons, making its total orders for next year 20,000 tons.

The contracts for structural and fabricated steel placed during August are estimated at 150,000 tons, including the 42,000 for the Manhattan bridge. Of this total approximately 50,000 tons was secured by the American Bridge Company. Orders about to be given include 20,000 tons for Harriman line bridges, and 15,000 tons for the Baltimore & Ohio bridges at Havre de Grace, and 18,000 tons for a rail mill at Gary.

The United States Steel Corporation, through its subsidiary companies, has received an order for 1,100 tons of rails for 1906 delivery, for a lime and cement company, and one for 1,300 tons for the Brooklyn Rapid Transit Co., in addition to the orders of the Lake Shore Electric Co. and the Chicago & Western Indiana, aggregating 5,300 tons. For 1907 delivery the Steel Corporation has orders for 4,500 tons for the Alabama & Vicksburg and allied companies.

The more important of the small contracts let during the last week in August include 750 tons for a highway bridge at Clay street, Passaic, N. J., over the Passaic river, 780 tons additional for the Baltimore & Ohio Washington terminal, 1,250 tons for an open hearth mill building for the Andrews Steel Company at Newport, Ky., and 650 tons for bridges for the Mexican National. The Chicago, St. Paul, Minneapolis & Omaha has let a bridge contract requiring 390 tons of steel.

The Ryan-Parker Construction Co., of New York, which has the contract for the Manhattan bridge, has let the structural work to the Phœnix Iron Co., of Phœnixville, Pa. It is understood that basic open-hearth steel will be used. The contract awarded to the Phœnix Iron Co. calls for about 34,000 tons. It does not include the cables, which will require about 8,000 tons. It is understood, also, that the question of anchorages is still unsettled. The total quantity of steel required will be about 83,970,800 lbs., or 41,985 net tons.

OBITUARY NOTICES.

Charles Thomas Bayless, Mechanical Engineer of the Mexican Central Railway, died on September 5th at his residence at Aguascalientas, Mexico. Mr. Bayless graduated from Stevens Institute of Technology in 1893, and entered the service of the *Railroad Gazette* at its Chicago office under the late David L. Barnes. He began railroad service as Draftsman in the Mechanical Department, and soon became the Chief Draftsman of the Mexican Central, and since 1901 he has been its Mechanical Engineer.

J. Rogers Barr, General Manager of the Lexington & Eastern, died at Lexington, Ky., Aug. 18. Mr. Barr was born in Louisville, Ky., in 1869, and was a graduate of Princeton University, where he took a scientific course. He left that institution in 1889 and soon afterward entered railroad service with the Baltimore & Ohio Southwestern in the civil engineering department. In 1894 he left that road to go to the Lexington & Eastern. In 1897 he was made General Manager of the latter road, the position which he held at the time of his death.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

Delaware, Lackawanna & Western.—The office of Assistant Auditor has been abolished, W. C. Swift having died recently. C. C. Hubbell has been appointed Auditor of Miscellaneous Receipts, and W. G. Vanderwater has been appointed Auditor of Disbursements, both with office at New York.

New Orleans, Natchez & Pacific.—This recently organized company held a meeting at Natchez, Miss., September 3, and elected A. B. Wheeler, New Orleans, President; W. J. Poitevant, New Orleans, First Vice-President; R. F. Larned, Natchez, Treasurer, and C. E. Moritz, Natchez, Secretary.

Operating Officers.

Chicago, Burlington & Quincy.—E. P. Bracken, Superintendent at Sterling, Colo., has been appointed Superintendent at Sheridan, Wyo., succeeding F. D. Weidenhamer, resigned.

Traffic Officers.

Southern Pacific.—H. A. Jones, heretofore on the Texas Lines, has been appointed Freight Traffic Manager, with office at San Francisco, succeeding William Sproule.

Engineering and Rolling Stock Officers.

Atchison, Topeka & Santa Fe.—James Dun, who has resigned as Chief Engineer of the Atchison, Topeka & Santa Fe System, has been appointed Consulting Engineer; office at Chicago.

Chicago, Burlington & Quincy.—H. E. Culbertson has been appointed Master Mechanic at McCook, Neb., succeeding F. E. Kennedy, transferred.

Pennsylvania Lines West.—Guy Scott has been appointed Engineer of Maintenance of Way on the southwest system, at Richmond, Ind., succeeding Robert Ferriday, resigned.

LOCOMOTIVE BUILDING.

The Isthmian Canal Commission has asked bids for 40 mogul locomotives.

The Salem, Falls City & Western, it is reported, has ordered one mogul locomotive.

The New York Central Lines, it is reported, have reserved space with the American Locomotive Co. for 200 locomotives.

The Chicago, Burlington & Quincy, it is reported, has ordered 66 locomotives. Fifty are for freight service and the remainder are for passenger service. The order has been divided between the Baldwin Works and the American Locomotive Co.

The Western Pacific, as reported in our issue of Aug. 24, has ordered 20 simple consolidation (2-8-0) locomotives from the Baldwin Works. The specifications are as follows:

General Dimensions.

Type of locomotive		Consolidation
Weight	on drivers	185,000 lbs.
	total	207,000 "
Diameter of drivers		57 in.
Diameter of cylinders		22 in. and 30 in.
Firebox	length	121 "
	width	40⅛ "
	grate area	33.6 sq. ft.
Heating surface, total		3,129 sq. ft.
Boiler	type	Straight top
	working steam pressure	200 lbs.
	number of tubes	390
	material of tubes	Gould Special Iron
	diameter of tubes	2 in.
	length of tubes	14 ft. 4 "
Tank capacity		8,000 gals.
Coal capacity		14 tons

Special Equipment.

Axles	Hammered steel
Brakes	Westinghouse
Couplers	Tower
Injector	Monitor
Sanding devices	Leach

CAR BUILDING.

The Nashville, Chattanooga & St. Louis, it is reported, will build 500 coal cars at its own shops.

The Southern, it is reported, has ordered a number of freight cars, including gondolas, flat and box cars.

The Chicago, Rock Island & Pacific, it is reported, has reserved space with the American Car & Foundry Co. for 5,000 box cars.

The Salem, Falls City & Western has ordered 24 flat cars of 70,000 lbs. capacity for October and November delivery. The cars will be 41 ft. long.

The St. Louis, Rocky Mountain & Pacific, it is reported, is in the market for upwards of 1,000 cars, including box cars, gondola cars and stock cars.

The Grand Trunk Pacific has ordered 1,900 box cars of 60,000 lbs. capacity from the Canada Car Co., and 600 Hart convertible ballast cars of 80,000 lbs. for 1907 delivery.

The Hartford & Springfield Street Railway has ordered two closed electric cars from the Wason Manufacturing Co. for October, 1906, delivery. The bodies and underframes will be of wood.

The Huntingdon & Broad Top Mountain has ordered 300 steel drop-bottom cars from the American Car & Foundry Co., and 200 steel drop-bottom cars from the Pressed Steel Car Co., all for December, 1906, delivery.

The Galesburg & Kewanee Electric has ordered two single-end interurban cars from the Niles Car & Manufacturing Co., for November delivery. These cars will weigh 46,000 lbs., and measure 46 ft. long, 8 ft. 6½ in. wide, and 13 ft. high, inside measurements. The special equipment includes:

Brakes	Peacock
Couplers	Van Dorn
Curtain material	Pantasote
Heating system	Peter Smith
Journal boxes	Symington
Trucks	Baldwin

The Tonopah & Goldfield, as reported in our issue of Aug. 10, has ordered one passenger car, one chair car, one express and mail car, and one baggage car from the Pullman Co., all for November delivery. The passenger car will be 60 ft. long by 9 ft. 8 in. wide over all. The special equipment for all includes:

Bolsters	Commonwealth
Brake-beams	Diamond Special
Brake-shoes	Christie
Curtain fixtures	Forsythe
Curtain material	Pantasote
Heating system	Safety Car Heating & Lighting Co.
Vestibules	Pullman

The Quebec Central is building 50 flat cars and 15 stock cars of 60,000 lbs. capacity at its Newington shops, for September and December delivery. The flat cars will be 36 ft. long by 9 ft. 2 in. wide over all. The stock cars will weigh 30,600 lbs. and will measure 35 ft. 6 in. long by 8 ft. 7 in. wide, by 7 ft. high, all inside dimensions. The special equipment will include:

Bolsters	Simplex
Brake-beams	Simplex
Brakes	Westinghouse
Couplers	Tower
Draft rigging	Minor
Journal boxes	McCord
Trucks	Simplex
Wheels	Laconia

The Pere Marquette, as reported in a previous issue, has ordered 2,000 box cars of 80,000 lbs. capacity from the Pullman Co., for December delivery. The cars will measure 36 ft. long by 8 ft. 6 in. wide, by 8 ft. 2½ in. high, all inside measurements. The special equipment includes:

Bolsters	American Steel Foundries Co.
Brakes	Westinghouse
Brasses	Climax
Couplers	Janney
Door fastenings	Security
Doors	Security
Draft rigging	Minor
Dust guards	Positive
Journal boxes	Symington
Roofs	Chicago Improved Winslow
Trucks	Barber

The Mobile Light & Railroad Co. has ordered six single and six double Brill semi-convertible cars from the American Car & Foundry Co. for October delivery. These cars will have a seating capacity for 28 and 48 persons. The weight of the single cars will be 14,000 lbs., and the double cars will weigh 26,000 lbs. The bodies and underframes will be of wood. The special equipment includes:

Axles	Brill	Dust guards	Brill
Bolsters	Brill	Heating system	None
Brake-beams	Brill	Journal boxes	Brill
Brake-shoes	Brill	Light	Electric
Brakes	Brill	Paint	Medium chrome yellow
Brasses	Brill	Platforms	Vestibuled
Couplers	Brill	Roofs	Monitor
Curtain fixtures	Keeler	Seats	Am. Car Co.—wood seats
Curtain material	Oakette	Springs	Brill
Door fastenings	American Car Co.	Trucks	21E. and 27Gl., Brill
Doors	American Car Co.	Vestibules	Detachable
Draft rigging	American Car Co.		

RAILROAD STRUCTURES.

Champaign, Ill.—The Illinois Traction Co. has started preliminary work on its new car barns, to be 200 ft. wide and 300 ft. long, and contain seven tracks. The cost of the work will be about $50,000.

Indianapolis, Ind.—The final plans for the extensive shops, roundhouses, etc., which the C., C., C. & St. L. is to build at Beachwood Grove, have been completed and bids are being asked for the work. It will take three years to build the works. The machine and erecting shop will be 312 ft. by 572 ft. The boiler shop is to have a capacity for 25 boilers. It is intended to have the machine and erecting shop completed this fall.

Macon, Ga.—Residents of this place, in connection with the City Council and the Macon Chamber of Commerce, are negotiating with the railroads to secure the building of a new passenger station.

Moncton, N. B.—General Manager D. Pottinger, of the Intercolonial, is asking bids for the steel superstructure of a bridge at Doaktown; also for one at Boiestown, and one at Boyer River, Quebec.

Montreal, Quebec.—The Canadian Pacific, it is said, is planning to replace about 48 of its present structures with steel bridges on its main line between Montreal and Quebec.

New York, N. Y.—The New York, Ontario & Western and the West Shore roads are to have a new ferry house at West Forty-second street. The contract will be let shortly.

Portage La Prairie, Man.—Plans and specifications are ready for the new union passenger station to be built by the Midland & Manitoba (Great Northern) and the Grand Trunk Pacific Railroads. Mayor E. Brown can give information.

Prince Albert, Sask.—A by-law will be submitted to the ratepayers to grant $25,000 towards the cost of a combined highway and railroad bridge to be built over the Saskatchewan river by the Canadian Northern.

Quebec.—The Canadian Pacific has concluded an arrangement with the management of the Intercolonial for the erection of a Union station at Quebec.

Rice Lake, Wis.—Residents have asked the Chicago, St. Paul, Minneapolis & Omaha to build a passenger station here. Plans have been made for putting up a new structure at a cost of $50,000.

St. Paul, Minn.—The announcement is made that nine of the ten railroads entering the city have agreed to build a railroad bridge across the Mississippi from the mouth of Phalen creek, at the base of Dayton's Bluff, to the West Side yards. Such a bridge will cost $800,000.

Topeka, Kan.—The Chicago, Burlington & Quincy is planning to build a new concrete steel bridge 240 ft. long, to carry two tracks, over Salt creek.

Washington, D. C.—Bids are wanted at the office of the Commissioners September 15 for constructing a plate girder bridge on K street over Rock creek and the canal, between Twenty-eighth and Twenty-ninth streets. Information may be obtained from Henry B. F. Macfarland, Commissioner.

Western Maryland.—Improvements which will cost upwards of $2,000,000 are to be made along the lines of this company. Most of the work, it is expected, will be completed by the end of this year. The work includes a double-tracking of two divisions, the laying of heavier rails, new grading, new bridges and re-ballasting. The double-tracking of the Emory Grove division will be the most important part of the work. Along this division an automatic block signal system will also be installed. Some of the old timber bridges along the line will be replaced by steel structures.

Winnipeg, Man.—Local reports state that the Canadian Northern has decided to build its new shops at Fort Rouge.

RAILROAD CONSTRUCTION.

New Incorporations, Surveys, Etc.

Arkansas, Louisiana & Gulf.—This company, which was incorporated some time ago to build a line from Pine Bluff, Ark., via Monticello, Star City, Hamburg and Bastrop, to Monroe, La., about 125 miles, it is said will shortly let contracts for building the line. J. M. Parker, of the Southern Development Company, has secured the rights of way and ground for new stations at Hamburg and at other points. P. B. Stewart, president of the Columbia Title & Trust Company, is interested. (See Construction Record.)

Aurora & De Kalb.—This road has been opened for traffic from Aurora, Ill., to Cortlandt, 26 miles.

Boston, Lowell & Lawrence (Electric).—The directors of this company have petitioned the Massachusetts State Commissioners for authority to build an electric line from Boston northwest to Lowell, about 28 miles. The petition is signed by the following directors: Butler Ames, Paul Butler, Spencer Borden, Jr., Oakes Ames and Charles F. Remington.

Buffalo & Susquehanna.—Preliminary work has been started by this company for the building of a new line from Plumville, Indiana County, Pa., to Sagamore, three miles, where one of the largest coal mines in that district is to be opened. Bids for the work are being received, and it is probable that the contract will shortly be let.

Carolina Mineral.—An officer writes that this company, which was recently incorporated in North Carolina, with $200,000 capital, has been projected by stockholders of the Colosses Gold Mining & Milling Co., of Waxhaw, N. C., and will be owned and operated as a close corporation by that company, not having any connections with other railroads. The road is to be built for the purpose of hauling ore to a central reduction plant already built. The grading work is under way and track-laying was to be started the first of this month. No contracts for this work have been given out. The proposed route is from the Colosses Mine north through Wedington and Providence to Charlotte, N. C., which is on the Seaboard Air Line and the South & Western. There is also to be an extension from the Colosses Mines south to Lancaster, S. C., which is on the Lancaster & Eastern and the Southern. Surveys are now being made for this extension. The work will be easy, being over a comparatively level country. J. F. Keller, Lancaster, Pa., is President, and A. J. Moore, Waxhaw, N. C., Chief Engineer. (Aug. 24, p. 50.)

Central Railway of Oregon.—This company, which was incorporated last June in Oregon with $2,000,000 capital, is offering $2,000,000 of bonds at the rate of $20,000 per mile. The company owns franchises for the operation of railroads in the Grand Ronde valley, Union County, Oregon. The original surveys cover about 100 miles of line. Fifty miles of this work is under way, and it is expected will be completed during the present year. Connections are to be made with the Oregon Short Line and the Oregon Railroad & Navigation Company.

Chicago, Burlington & Quincy.—The line running north from Ashland, Neb., has been extended to Sioux City, Iowa, 108 miles from Ashland, and is now in operation.

Chicago, Milwaukee & St. Paul.—This company has made public a part of the route of its Pacific coast extension. The western terminal is to be at Seattle and on the east the line is to be an ex-

tension of the Aberdeen branch; but from Butte westward the line is still in doubt, although some work is being done at Seattle. The extension leaves the Aberdeen-Evarts line at Glenham, about ten miles east of the Missouri river, and runs northwesterly to the point where a bridge will be built across the river; thence northwest through Boreman and Schnasse counties, South Dakota, into North Dakota at the northeast corner of Butte County, South Dakota. It will traverse Hettinger, Bowman and Billings counties, North Dakota, crossing the line between North Dakota and Montana about ten miles north of the north line of Bowman County. In Montana the line is to run northwest, crossing the Northern Pacific and the Yellowstone river at Erric. It will then run south of the Yellowstone to a point directly opposite Forsythe, Mon. From that place it is to run as directly as possible to Musselshel, on the big bend of the Musselshel river. At Harlowton it connects with the Montana Railroad Company's line from Lewiston to Lombard. This line has been bought by the St. Paul and the track from Harlowton to Lombard, 95 miles, will be used. From Lombard into Butte the new line will closely parallel the Northern Pacific.

The Sioux City and Dakota division of this road has been extended from Corsica, S. Dak., west to Stickney, 12 miles; and the White River Valley Line has been extended from Presho, S. Dak., west to Murdo Mackenzie, S. Dak., 35 miles.

CHICAGO, ROCK ISLAND & PACIFIC.—An officer writes that grading work on the Rock Island, Arkansas & Louisiana is being done by the Dalhoff Construction Co., of Little Rock, Ark. The line is from Alexandria, La., south, paralleling the Texas & Pacific to Lamourie, and thence to Eunice, 56 miles. No track has yet been laid. The work is not difficult, maximum grades being 4/10 per cent. and maximum curves 3 degrees.

CONEMAUGH VALLEY STREET RAILWAY.—The directors of this company have authorized a bond issue of $1,000,000 to build an electric line from Johnstown, Pa., to Ebensburg. The promoters of the road are residents of Johnstown, Pa.

DENVER, ENID & GULF.—An officer writes that the Denver, Kansas & Gulf, a part of the D., E. & G., is being built by the Kansas Construction Company, general offices Medicine Lodge, Kan. The proposed route is from Kiowa, Kan., northwest to a connection with the Englewood branch of the Atchison near Belvidere, 50 miles, following the valley of the Medicine river, passing through Medicine Lodge, Lake City and Sun City. Track has been laid to a mile north of Medicine Lodge; grading is completed to Sun City and under way to the connection, 10 miles; maximum grade, $^{6}/_{10}$ per cent.; maximum curves, 3 deg. J. W. Beatty, Medicine Lodge, Kan., is the engineer in charge.

DENVER, KANSAS & GULF.—See Denver, Enid & Gulf.

DES MOINES, WINTERSET & CRESTON (ELECTRIC).—Plans are being made by this company for building an electric line from Des Moines, Iowa, southwest via Winterset to Creston, about 65 miles. A terminal contract has been made with the Des Moines City Railway Co., which provides for a loop in Des Moines. The company also has a terminal franchise in Creston. The road will be built to carry heavy freight as well as passengers, and will have light grades. The headquarters of the company are at Des Moines. (See Construction Record.)

EASTERN RAILWAYS COMPANY.—The stockholders of this company have voted to build a high-speed electric line between Pottsville, Pa., and Mauch Chunk, and have authorized the expenditure of $1,500,000 for this and other new lines.

ELDORADO, MARION & WESTERN.—See Missouri Pacific.

ELK, BIRCH & GAULEY.—Incorporated in West Virginia, with $100,000 capital, to build a line from the Birch river, in Braxton County, W. Va., southeast to Camden-on-Gauley, in Webster County, about 30 miles. The incorporators include P. T. West, Grafton; G. S. Bennett, Amos; C. A. Shaw, Shinnston, and E. T. Tetrick, Clarksburg, W. Va.

HATTIESBURG & MAMMOTH SPRINGS (ELECTRIC).—Incorporated in Mississippi with $100,000 capital, to build an electric line from Hattiesburg, Miss., on the Gulf & Ship Island, Mississippi Central, Mobile, Jackson & Kansas City, and New Orleans & Northeastern, south to Mammoth Springs, on the Gulf & Ship Island, about twelve miles. E. F. Ballard, J. Fitch and others are interested.

INDIANAPOLIS, HUNTINGTON, COLUMBIA CITY & NORTHWESTERN (ELECTRIC).—An officer writes that this company, which was recently incorporated, will shortly let contracts for building its proposed electric line from Goshen, Ind., south via Columbia City, Huntington, Marion, Elwood and Noblesville to Indianapolis, approximately 150 miles. (Aug. 17, p. 45.)

KINGSPORT SOUTHERN.—Incorporated in Tennessee with $20,000 capital to build a line 20 miles long from Sinking creek, Washington County, Tennessee, north to a point on the Virginia state line. D. V. Mullens, A. P. Moore, A. B. Whitaker, J. A. Dickey and J. C. Anderson, of Bristol, Tenn., are interested.

LOUISVILLE & NASHVILLE.—According to reports this company is planning to ask for bids for double-track work between Corbin and Livingston, Ky., 20 miles. Engineers at work for the past six weeks have about completed their work.

MCCLOUD RIVER.—An officer writes that this company, which operates 37 miles of road in California, from Upton on the Southern Pacific east to Bartle, has completed an extension 14.38 miles beyond Bartle to McGavic. Trains are now running on the extension. The company intends to further extend from McGavic next year. The entire line has been laid with 60-lb. rails.

MAINE ROADS (ELECTRIC).—A contract has been let for building an electric line through Wells, Me., such a line connecting York and Kennebunkport, Me., about 20 miles apart. This will complete a continuous line of electric roads from Boston to Bath and Lewiston, Me. The grading is to be completed by December 1 and the road is expected to be opened by the middle of next summer.

MEXICAN PACIFIC.—The survey for this proposed railroad, the construction of which will open up the resources of the states of Chiapas, Tabasco, Campeche and Yucatan, has been completed under the direction of Pedro A. Gonzalez, Chief Engineer. The line is to be built by American capital, the promoter of the enterprise being J. M. Neeland. It will give a direct railroad connection with Yucatan. It will run from the town of Jalisco, on the main line of the Pan-American, to Tuxtla, the capital of the state of Chiapas. From Tuxtla it will continue to San Juan Bautista, the capital of the state of Tabasco, and thence to Campeche, the capital of the state of the same name. At Campeche it will connect with the United Railways of Yucatan. The route of the proposed road is through a region of far southeastern Mexico now wholly undeveloped.

MEXICAN ROADS.—The Mexican government has granted a concession to A. S. Mackenzie to build a railroad from Carbo, on the Sonora branch of the Southern Pacific, to Copeta, a mining town in the state of Sonora. Under the terms of the concession the road must be completed within five years. It is stated that Mr. Mackenzie represents a strong syndicate of American and Mexican capitalists, and that the building of the road is assured. The headquarters of the company will be at Hermosillo, Mexico.

MISSOURI PACIFIC.—According to reports from Illinois, the St. Louis, Iron Mountain & Southern has secured control of the Eldorado, Marion & Southwestern, promoted by Sam Brush and other Southern Illinois coal operators. It is a coal road, partly built. The route is from Eldorado, Ill., which is on the C., C., C. & St. L., the Illinois Central and the Louisville & Nashville, west to Marion, which is on the Chicago & Eastern Illinois, the Illinois Central, and the St. Louis, Iron Mountain & Southern, distance about 30 miles.

MOBILE & OHIO.—Under the name of the Hiwanee & Tombigbee, application has been made to build a line from Hiwanee, in Wane County, Miss., to the Tombigbee river in Alabama, about 35 miles. Col. E. L. Russell and others of Jackson, Miss., are interested in the project.

NEW YORK, WESTCHESTER & BOSTON.—This company has filed maps, giving its complete route through Mount Vernon, New Rochelle, Larchmont, Mamaroneck, Rye and Port Chester to the Connecticut line; also giving the route from Mount Vernon through the different towns to White Plains. Large numbers of additional men will be put to work within the next few weeks.

PELHAM & FLORIDA.—Incorporated in Georgia with $250,000 capital to build a line from Pelham, Ga., to Havana, Fla., 40 miles, through Grady County. The incorporators are: J. B. Martin, J. F. Lewis, R. Black, J. Lane, W. T. Banburg, H. C. Briggs, of Valdosta; C. H. Butler, of Calvary; H. A. Sanders, of Whigham; C. J. Stevens, of Milltown, and W. L. Perkins, of Jennings, Fla.

PORTLAND & NORTHERN (ELECTRIC).—Application has been made for a charter by a company under this name to build an electric line from Cumberland Mills, Maine, via Naples to Bridgton, 38 miles. S. O. Hancock and R. Cook, of Casco; E. N. Mason, of Raymond; E. B. Jillson, Otisfield, and others are interested.

PORTLAND & RUMFORD FALLS.—Surveys are being made by this company at Gray, New Gloucester and other towns for the proposed extension of the road from Lewiston Junction, Me., to Portland. It is said that the Canadian Pacific, which has long been seeking a means of reaching the Seaboard at Portland, has made arrangements for a connection over this road.

PRINCE ALBERT & NORTHERN SASKATCHEWAN.—This company, which is backed by capitalists of Prince Albert, Sask., recently obtained a charter and has commenced the construction of its proposed line from that place to Hudson's Bay. It is said that additional grading contracts will shortly be let.

ROCK ISLAND, ARKANSAS & LOUISIANA.—See Chicago, Rock Island & Pacific.

ST. LOUIS & SAN FRANCISCO.—This company has completed the

extension of its Winkler branch from Winkler, Mo., to De Camp, Mo., six miles, and trains are now running.

Silverton Northern.—This company has extended its road from Eureka, Colo., north to Animas Forks, Colo.

Sioux City, Pierre & Northwestern.—Incorporated in South Dakota with $1,000,000 by A. S. King, E. M. Thompson and G. N. Borden, of Minnesota, and Philip Lawrence and Marion Hoke, of Huron, S. D., with offices at Huron and in Minneapolis. The proposed line is to occupy practically the same territory as that covered by the Dakota Midland, as far as Sioux City, passing through the counties of Union, Clay, Yankton, Hutchinson, Douglas, Davison, Aurora, Brule, Buffalo, Hyde and Hughes. At Sioux City the Midland project is to extend north to the line between North and South Dakota, but the Sioux City, Pierre & Northwestern project turns to the east through the counties of Hughes, Hyde, Hand, Beadle, Kingsbury and Brookings to the Minnesota state line and to Minneapolis. The promoters also contemplate building a branch northerly from Sioux City to Sioux Falls, through the counties of Union, Lincoln and Minnehaha. The total estimated length of the line is 600 miles, and the estimated cost of the work $50,000,000. This is reported to be a project of the Chicago & North-Western.

Southern.—According to reports this company has given a contract to W. J. Oliver, of Knoxville, Tenn., for excavation work at Charlotte, N. C., for new yards at Spencer and for grading on the new line from Lookout Mountain into Chattanooga.

Southwestern Interurban.—Incorporated in Kansas to build interurban lines between Arkansas City and Parsons and Coffeyville, through the counties of Labette, Montgomery, Chautauqua, Sumner, Sedgwick and Wilson. The names of the incorporators are not given.

Southwestern Missouri (Electric).—Incorporated in Missouri with $5,000,000 capital to build electric lines aggregating 101 miles in Jasper County, Missouri, and Southeastern Kansas. The proposed routes are as follows: From Carthage, via Webb City and Joplin, to Galena, Kan., thence to Baxter Springs, Kan.; from Joplin via Duenwig to Carterville, in Jasper County; from Webb City to Oronogo, Purcell and Alba to Carthage; from Joplin and Webb City via Carl Junction in Jasper County, to Pittsburg and Columbus, Kan. The incorporators are: H. Rogers, of Joplin; E. E. Wallower, E. Bailey, A. Riley, all of Harrisburg, Pa.; I. W. Frey, Joplin; Samuel McReynolds, of Carthage, and W. S. Chinn, of Webb City.

Tampa & Jacksonville.—A contract is reported let by this company (formerly the Gainesville & Gulf) to W. H. Jones, of Mayo, Fla., for grading 53 miles of road; from Crystal river to Brooksville 28 miles, and from that point to the Withlacoochee river, in the direction of Tampa, 25 miles.

Trinity & Brazos Valley (Colorado Southern).—This company has extended its road from Mexia, Tex., south 14 miles to Teague.

Vining & Coleman.—Application has been made to the secretary of state at Austin, Tex., to revive the charter of this company, organized several years ago by Bird S. Coler, of New York, and associates to build a road from Coleman, Tex., to Waldrip. Nothing was done to carry out the project and the charter lapsed. W. L. Vining, who was interested in the original company, has interested St. Louis capitalists in the proposed road, and it is stated that it will now be built from Coleman, Tex., on the Gulf, Colorado & Santa Fe, southeast to Austin, about 150 miles.

Virginia & Truckee.—This company has opened a new branch from Carson City, Nev., to Minden, 15 miles.

Wabash.—A press despatch from Pittsburg says that a contract is soon to be let for building a connecting track between the West Side Belt and the Pittsburg & Lake Erie, at Saw Mill Run.

Whitehall & Granville (Electric).—Announcement is made that work has been started on an extension of this road. A length of nine miles from Whitehall, N. Y., southeast to Granville, was finished about two years ago. The company has been reorganized and F. B. Gridley, of Troy, N. Y., is the Engineer in charge. The line is to be extended from Middle Granville, N. Y., southeast to West Pawlet, Vt.

Wisconsin Central.—The Ladysmith branch of the Third district of the Northern division has been opened for business from Owen, Wis., north to Ladysmith, 45 miles.

Wynne, Newport & Western.—Incorporated in Arkansas with $280,000 capital to build a line from Wynne to Newport, about 40 miles. The directors are as follows: Sigmund Wolff, of St. Louis; Isaac Goldman, M. W. Stuckey, J. S. Welmons, George R. Hays, H. A. Block, J. L. Hare, J. C. Harrell, W. H. Barnes and O. N. Killough. The line as surveyed traverses some of the richest sections of Cross and Jackson counties.

RAILROAD CORPORATION NEWS.

Chicago, Burlington & Quincy.—The New York Stock Exchange has listed $23,842,000 additional Illinois division 4 per cent. bonds of 1949, making the total amount listed, $34,148,000. Of this additional amount, $19,682,000 was issued to refund the consolidated 7 per cent. bonds originally due July 1, 1903, and extended for two years at 4 per cent.; $4,154,000 for improvements and additional equipment, and $6,000 for other purposes.

The gross earnings of this company for the year ended June 30, 1906, were $73,413,386, an increase of $7,440,341; net earnings, $20,739,731, a decrease of $1,132,981; surplus, after charges, $12,844,023.

Chicago Railways Company.—The directors of this company, which has been formed to take over the Chicago Union Traction and other Chicago street railways, are: M. E. Sampsell, F. H. Rawson, H. A. Blair, W. N. Elsendrath, E. D. Hulbert, J. H. Eckels, John W. Gary, G. W. Wickersham and L. C. Krauthoff. (June 15, p. 176.)

Chicago Union Traction.—See Chicago Railways Co.

Erie.—The gross earnings for the year ended June 30, 1906, were $50,002,634, an increase of $4,277,897; net earnings (taxes deducted), $14,129,797, an increase of $1,547,268; surplus, after fixed charges, expenditures for additions, improvements and dividends, $533,975, an increase of $43,530.

Grand Trunk.—Earnings for June and for the fiscal year were as follows:

	1906.	1905.	Inc. or dec.
Gross	$2,792,400	$2,578,761	Inc. $213,639
Operating expenses	2,243,945	1,758,267	Inc. 485,678
Net	$548,455	$820,494	Dec. $272,049
Fiscal year:—			
Gross earnings	$30,710,534	$28,511,850	Inc. 2,198,684
Operating expenses	22,048,651	20,091,345	Inc. 1,957,306
Net	$8,661,883	$8,420,505	Inc. $241,378

Interborough Rapid Transit.—The Manhattan Railway Company has applied to the New York State Railroad Commissioners for permission to issue $4,800,000 new capital stock, the proceeds to be used to reimburse the I. R. T. Company for expenditures and to pay land damages.

Kansas City Southern.—The Port Arthur Canal & Dock Company has made to the Equitable Trust Company, Trustee, a mortgage to secure $1,000,000 5 per cent. bonds, replacing the issue of 1904. The new mortgage covers all the property of the Canal & Dock Company, except seven miles of waterway, which is to be transferred free to the United States government.

Missouri & North Arkansas.—This company has filed a mortgage to the St. Louis Union Trust Company, Trustee, to secure an issue of $11,500,000 first mortgage 4 per cent. bonds. (Aug. 17, p. 46.)

New York, Chicago & St. Louis.—The gross earnings for the year ended June 30, 1906, were $9,651,819, an increase of $1,000,762; net earnings, $2,169,960, an increase of $469,026. The surplus, after charges and dividends, was $142,251, as compared with a deficit during 1905, $64,657.

Pennsylvania.—It was announced Sept. 3 that the Pennsylvania had sold 400,000 shares of Baltimore & Ohio stock and 160,000 shares of Norfolk & Western stock to Kuhn, Loeb & Co., thus reducing the aggregate holdings of these securities by the Pennsylvania Railroad system to about 20 per cent. in each company. According to the official statement, this sale was made by the Pennsylvania system, and therefore included shares held by the Pennsylvania Company, the Northern Central and the Philadelphia, Baltimore & Washington. It is estimated that the proceeds of the sale, together with what can be appropriated out of earnings, will just about cover the $40,000,000 which Mr. Cassatt stated would be necessary to complete the New York tunnels.

Philadelphia Company.—Stockholders of record Sept. 5 can subscribe up to Sept. 20 to the extent of 9 per cent. of their holdings for $3,240,000 of the $6,000,000 new common stock recently issued. (Aug. 24, p. 52.)

Seaboard Air Line.—The gross earnings for the year ended June 30, 1906, were $15,116,947, an increase of $1,497,673; net earnings, $4,603,486, an increase of $76,575; surplus, after charges, $992,121, a decrease of $91,971.

Union Pacific.—This company will redeem on November 1 at 102½ and interest all the outstanding (less than $600,000) first lien convertible 4 per cent. bonds.

West Jersey & Seashore.—The Somers Point branch of this road on August 25th was abandoned and passenger service discontinued. On the same date the Atlantic City & Shore Railroad Company commenced its electric service over the line between Pleasantville and Somers Point.